PB81-158289

Proposed Issuance of a New Source National
Pollutant Discharge Elimination System
Permit to Estech General Chemicals Corporation
Duette Mine, Manatee County, Florida

(U.S.) Environmental Protection Agency
Atlanta, GA

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Estech General Chemicals Corporation has proposed an open pit phosphate mine, beneficiation plant and rock dryer on a 10,394 acre site in northeastern Manatee County, Florida. Mining will involve 6,600 acres, most of which will be reclaimed, and will produce 3 million tons per year for 21 years. The EIS examines alternatives, impacts and mitigative measures related to surface water, groundwater, air, wetlands, and other natural and cultural systems.

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United States Environmental Protection Agency
Region 4
345 Courtland St. NE.
Atlanta, GA. 30365
EPA 904/9-80-051

PB81-158289

EPA Environmental Impact Statement

Final

Estech General Chemicals Corporation Duette Mine Manatee County, Florida

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SPRINGFIELD, VA 22161

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FINAL
ENVIRONMENTAL IMPACT STATEMENT

for

Proposed Issuance of a New Source National
Pollutant Discharge Elimination System Permit

to

Estech General Chemicals Corporation
Duette Mine
Manatee County, Florida

prepared by:

U.S. Environmental Protection Agency
Region IV, Atlanta, Georgia 30365

cooperating agency:

U.S. Army Corps of Engineers
Jacksonville District
Jacksonville, Florida 32201

Estech General Chemicals Corporation has proposed an open pit phosphate mine, beneficiation plant and rock dryer on a 10,394 acre site in northeastern Manatee County, Florida. Mining will involve 6,600 acres, most of which will be reclaimed, and will produce 3 million tons per year for 21 years. The EIS examines alternatives, impacts and mitigative measures related to surface water, groundwater, air, wetlands, and other natural and cultural systems.

Comments will be received until October 12, 1980

Comments or inquiries should be directed to

A. Jean Tolman, EIS Project Officer
U.S. Environmental Protection Agency
Region IV
345 Courtland Street, NE
Atlanta, Georgia 30365
(404) 881-7458

approved by:

Rebecca W. Hanmer

Rebecca W. Hanmer
Regional Administrator

August 19, 1980
Date

Summary Sheet For Environmental

Impact Statement

Duette Phosphate Mine

Estech General Chemicals Company

( ) Draft
(X) Final

U. S. Environmental Protection Agency, Region IV
345 Courtland Street NE
Atlanta, Georgia 30365

1. Type of Action : Administrative (X) Legislative ( )

2. Description of Action

Estech General Chemicals Corporation is proposing to construct and operate a phosphate mine beneficiation plant, and rock drying facility in northeastern Manatee County, Florida. The EPA Region IV Administrator has declared the proposed facilities to be a new source as defined in Section 306 of the Federal Clean Water Act.

In compliance with its responsibility under the National Environmental Policy Act (NEPA) of 1969, EPA Region IV has determined that the issuance of a new source National Pollutant Discharge Elimination System (NPDES) permit to the proposed mining and beneficiation facility would constitute a major Federal action significantly affecting the quality of the human environment. Therefore, this Environmental Impact Statement was prepared in accordance with the requirements of NEPA and EPA regulations at 40 CFR Part 6.

The proposed facility, the Duette Mine, encompasses 10,394 acres of which approximately 6,600 acres are deemed mineable according to present economic, environmental and technological limitations. The mining operation is planned to nominally produce 3 million tons of phosphate ore annually for a period of 21 years. Estech presently operates the Watson and Silver City Mines in southwestern Polk County, Florida. The Duette Mine will serve as a replacement for these facilities as their production expires.

Components of the proposed facilities include two draglines with 50 cubic yard buckets; hydraulic ore transportation via pipelines to a central washer for ore disaggregation and pebble recovery; a feed preparation and flotation plant for extraction of finer phosphates; a drying facility to reduce moisture in the phosphate rock from 13% to 2%; and shipment via rail.

Operation of the proposed facilities requires a mining plan, a water management system, and an integrated waste disposal reclamation plan.

The mining plan proposed by Estech calls for the preservation of the majority of the sensitive or unique natural vegetation. The preservation areas include the sole cypress stand on the site (18 acres), a 50 acre stand of sand pine scrub, and the wooded floodplains of the major streams. The mining plan as originally proposed by Estech and evaluated in the DEIS also called for mining a three-quarter mile segment of the East Fork of the Manatee River. In accordance with EPA's recommendation in the DEIS, Estech has revised its proposal to exclude mining of that segment. To protect wetlands along streams, the mine plan incorporates active mining along only one side of a wetland at a time.

The proposed disposal plan will utilize a sand-clay mix in the approximate ratio of 2.5 to 1 (by weight). A single 480 acre conventional clay settling area is proposed to receive all clay wastes generated before the sand-clay mix procedure becomes operational. It will remain active throughout the mine life to receive clay wastes in excess of the sand-clay mix requirements and to serve as a supplemental water clarification and storage area. Sand tailings in excess of the amounts required in the sand-clay mix process will be deposited in mining cuts.

The proposed water management plan divides the needed supply between surface and ground-water resources, minimizes mining process consumption, and provides for recharge of the Floridan Aquifer. The Consumptive Use Permit issued by the Southwest Florida Water Management District allows groundwater withdrawal at a rate of 13 mgd for the first 3 years. During this time, a 200 acre surface water reservoir will be constructed to provide storage for 3 mgd, thereby decreasing groundwater use to 10 mgd. Prior to withdrawal, a recharge system will be constructed to transmit water from the surficial aquifer into the deep system.

The proposed reclamation plan will be accomplished by the physical restructuring and refilling of disturbed sites followed by revegetation. The proposed methodology is designed to return the site to land forms compatible with its rural, agricultural setting. The reclaimed site will consist of improved pasture, marsh and wetland environments, five lakes, and a 100 acre "wilderness" area allowed to revegetate naturally. The proposed plan aims to provide long range water quality and biological diversity as well as aesthetic values in land form diversity, wildlife protection, recreational uses, and water resources.

3. Alternatives Considered

A. Beneficiation plant sites were evaluated to minimize loss of phosphate resource, water pumping, ore and waste transportation, road and utility construction, and destruction of environmentally sensitive areas. Six sites were considered.

B. Production rate alternatives were evaluated considering both environmental and economic parameters. Environmental aspects considered included rate of habitat alteration/destruction, rate of groundwater withdrawal, and level of air emissions. Economic considerations included production costs, overall rock demand and growth, and Estech's present production and marketing. Alternatives were selected to evaluate the effects of various production rates rather than to designate an optimum production rate.

C. Resource recovery alternatives were evaluated with consideration given to impacts on environmental resources and recovery of mineral resources. The primary consideration was phosphate ore underlying forested swamps or marsh areas.

D. Mining methods were evaluated to assess ore recovery rates, energy use, water use and conservation, environmental resources, and safety. Alternatives examined were electric draglines, dredges, bucket wheel excavators, and technique combinations.

E. Ore transportation alternatives were evaluated considering the factors of technical and operational feasibility, cost, energy use, water conservation, and impact to the environment. Conventional slurry pumping, conveyors, and trucks were transportation methods considered.

F. Beneficiation process alternatives were evaluated for energy and water use efficiencies within proven state-of-the-art technology. Alternative processes considered were conventional beneficiation, total acidulation, and blast furnace.

G. Process water sources were evaluated to conserve the regional resource while providing a sufficient quality and quantity of water. Supply alternatives considered were use of surface water and groundwater, total requirement from the Floridan Aquifer, use of surface water in rainfall catchment, and use of water from the surficial aquifer.

H. Waste disposal and reclamation plans were evaluated for methods to dispose of sand and clay wastes in a manner that economically restores disturbed land to a productive state. Physical restoration and revegetation were considered in light of existing and planned environmental systems.

I. Surface water discharge alternatives were evaluated from two respects: volume of water discharges and point of discharge. Volume alternatives considered containment of long term accumulation, containment of short-term accumulation, containment to offset evaporation losses only, and no containment. Eight points of discharge were evaluated. Each alternative was discussed in terms of environmental impacts, water use and economics.

J. Rock drying alternatives were evaluated to select an alternative which provided dry rock for shipping and met air quality standards. Alternatives assessed were construction of

a dryer at the mine site, use of an existing dryer, construction of a dryer at a remote location, and shipment of wet rock.

K. Transportation and energy source alternatives were evaluated. Transportation alternatives included railroad with truck as emergency mode, trucks only, pipeline to port, and conveyor. Energy source alternatives assessed were commercially available electric power and various methods of on-site generation.

L. A no-action alternative was evaluated considering environmental and socioeconomic impacts of not constructing the mine, beneficiation plant, or rock drying facility.

4. Summary of Major Environmental Effects

Each of the selected alternatives was integrated into the appropriate land or water management strategy: the mining plan, waste disposal/reclamation plan, and water management plan, collectively the proposed activity. Environmental impacts of the proposed activity were then assessed. The major emphasis of the impact assessment was to identify means of minimizing the degree and extent of negative impacts caused by the mining operation at any one time and to minimize the permanent alteration and/or destruction of natural systems and environmental resources.

The direct effect of mining will be the physical destruction of much of the present natural vegetation and the alteration of the site's soils and topography. The proposed reclamation plan is intended to mitigate the long-term negative impacts of the mining operation. Major impacts to three major systems are:

Land - Overall, 85% of the native upland vegetation will be lost. Reclamation is designed to replace most natural land communities with improved pasture, thereby largely precluding the re-establishment of original vegetation. A 50 acre stand of sand pine scrub is marked for preservation.

Land-Water Interface - Due to the uncertainties of wetland restoration, only Category 2 and 3 wetlands will be mined. Of these, approximately 421 acres of freshwater swamps and 364 acres of freshwater marshes will be destroyed. Proposed reclamation will attempt to restore these acreages and contribute additional acres of land-water interface for a net gain, if successful, of approximately 15%.

Water - The direct impact of mining will be the destruction of 417 acres of ephemeral feeder streams and their floodplains. The remaining aquatic areas will suffer stress resulting from changes in temperature, sunlight, erosion, water table drawdown, and addition of various chemicals. The wooded floodplains of the major streams are excluded from mining.

Mining will create several lakes on the site, which is a significant expansion of the aquatic environment.

The proposed activity will significantly alter the site's original topography through strip mining and waste clay disposal activities. The long-term, net effects on topography are directly reflected in the proposed reclamation, which largely returns the site to pre-mining elevation and relief. On-going reclamation will limit the number of acres disturbed at any given time to about 700-800 acres.

Proposed mining will disturb the existing soils on approximately 75% of the site. Existing soil profiles will be destroyed and in general the surface horizon will be buried. Waste disposal and physical reclamation will result in three new types of surface soils: clay, sand-clay, and overburden. Each of the new reclaimed soil types has distinct agricultural and engineering properties that relate to post-reclamation land use potential.

The average annual groundwater withdrawals will be limited to 13 mgd less recharge of 3 mgd for a total net consumption of 10 mgd. During the fourth year of mining, approximately 2.88 mgd of water will be diverted from the East Fork of the Manatee River to a surface water storage reservoir.

The primary effect of withdrawals from the deep groundwater system is the lowering of the potentiometric surface within the area of influence of the wells. This effect will be extremely small in comparison to the large seasonal fluctuation. Potential impacts to water quality in the deep aquifer system may be caused by the dewatering/recharge projects which directly transmit water from the shallow system to the deep aquifer system. Monitoring of the quality of water being discharged is required by the Southwest Florida Water Management District.

The primary effect of the mining on the shallow groundwater system will be the lowering of the water level within the system by the dewatering and/or recharge wells.

The proposed reclamation project may cause changes in water quality in the surficial aquifer as well as changes in on-site flow patterns within the surficial aquifer.

During active mining, stream flow into Lake Manatee will decrease by approximately 9%. After reclamation the average flows of the East and North Forks of the Manatee River will be reduced approximately 0.7 mgd and 0.6 mgd respectively. This decrease will be the result of increased impoundments in lakes and marshes and the sand/clay mix land fills. The major drainage courses on the mine site will be left undisturbed.

Discharges to streams leaving the proposed mine site from the plant water system may be necessary due to temporal variation in rainfall. It is anticipated that approximately 1.9 mgd will be discharged into the East Fork of the Manatee River during

August and September of an average rainfall year; effluent will be discharged at a rate of 1.8 mgd into the North Fork during August, September, and October.

The proposed mining may be expected to contribute both primary and secondary air quality effects. Primary effects will be contributed by the operation of two phosphate rock dryers, storage, materials handling, and shipping facilities, as well as fugitive dust from land clearing and reclamation activities. Secondary effects will be contributed by population, commercial, and industrial development induced by the proposed project. Primary emissions from the rock dryers and associated facilities are very fine clay and phosphate rock particulates and by-products of the combustion of fuel oil, e.g., sulfur dioxide and ash. The proposed sources will not violate air quality standards nor significantly degrade air quality. SO_2 and particulate matter emissions will satisfy New Source Performance Standards and BACT.

There are no significant noises associated with mine-related activities that could be considered intrusive or detrimental to sensitive receptors because of spectral content or intermittency.

A potential direct impact of mining and beneficiation is that of occupational radiation exposure. The primary exposure areas are the rock pile transfer tunnels. The Duette operation, having both a plant design including properly ventilated tunnels and a lower product radioactivity level than the general mining region, should not exhibit adverse occupational exposure. The proposed fugitive dust control on dryer emissions should also limit off-site transport of airborne radioactivity to the point where annual dose cannot be measured within the statistical variation of natural background.

Upon completion of mining, reclaimed lands will have different radiological characteristics than the land before mining. Considering future agricultural uses of the site, the most important pathway is the direct uptake of radium-226 by row crops grown on the reclaimed clay settling area. Although the radium content is highest here, the land will be agriculturally suited for row crops. Study results suggest that the excess availability of the major cations produce a discrimination against uptake of Ra^{++} in the clay soils containing higher than normal radium-226. Regarding future residential development of the site, predicted indoor radon progeny levels indicate only the reclaimed settling area may produce levels requiring remedial action. The predicted clay land form indoor radon progeny level is 0.015 WL (working level). If the clay settling areas are excluded for structural reasons or topsoil replacement occurs, no reclaimed lands are predicted to produce homes with radon progeny levels near the 0.02 WL remedial action level.

Surface water radium-226 concentrations in off-site environs may be elevated from natural levels of 0.8 pCi/l to 2 pCi/l. The drinking water standard for radium-226 is 5 pCi/l. The

groundwater radium-226 concentrations at the site are between 0.8 and 6 pCi/l and are less than those observed in some non-mining regions. Radium-226 levels in groundwater appear to be associated with local subsurface conditions which are below the zone of surface mining influence.

The socioeconomic impact of the proposed mining will exhibit a generally beneficial effect. Operation of the mine will directly require 324 workers, many of which will be relocated employees of the applicant. Some workers will be obtained from the Manatee County labor force. The direct economic effects of the mine are favorable, producing approximate annual yields of $382,400 in sales tax, $1.92 million in severance tax and $1.982 million in Ad Valorem tax. Regional economy effects derived through standard multipliers indicate an annual indirect impact of $35.4 million and an annual induced impact of $118.4 million. Estimated employment associated with the activity is similarly projected to be 235 through indirect impact and 1425 through induced impact. The mine will exert no directly discernable effects on community services and facilities as the operation will be self-sufficient in terms of minor medical treatment, water supply, fire and police protection, solid waste disposal and internal transportation facilities. The mine will not measureably increase demand on regional facilities for education, major medical treatment, recreation and transportation.

Long-term land use patterns should not be adversely impacted by the mining activity. The site is proposed for agricultural uses in the Manatee County Comprehensive Plan. The planned mine reclamation program is designed to return the site to land forms amenable to a variety of agricultural uses. On the short-term, the proposed mine site is located between two approved phosphate mines and therefore should not disrupt near-future land use trends in the area.

The no-action alternative of not constructing the mine, beneficiation plant, or rock drying facility would exert little effect, positive or negative, on regional or local projections for population growth, economic growth, or demands for community services and facilities. Economic benefits of the proposed mine, both from taxes and from the projected annual expenditures by Estech for products and services, would not be realized.

The no-action alternative would mean that 61.5 million tons of phosphate rock resource would be unavailable at least in the short term. The unavailability of the resource means that potential for improvement to the Nation's balance of payments would be lost for the time being. However, value of the reserve may increase as the world's reserves become scarce. Moreover, as the year 2000 approaches, domestic reserves may take on strategic importance for the United States.

5. Identified Issues and Concerns

The Draft Environmental Impact Statement (DEIS) was made available to the Council on Environmental Quality (CEQ) and the public during October 1979. A public hearing on the DEIS was held in Bradenton, Florida, on November 28, 1979. Written and verbal comments on the DEIS were received from the following:

Federal Agencies

U.S. Department of Health, Education and Welfare, Public Health Service
U.S. Department of the Interior
U.S. Department of the Army, Corps of Engineers
U.S. Department of Agriculture, Forest Service
U.S. Department of Agriculture, Soil Conservation Service
U.S. Department of Commerce, National Oceanic and Atmospheric Administration
U.S. Department of Commerce, Secretary for Science and Technology

Local Government

Sarasota County
Tampa Bay Regional Planning Countil

Interested Groups

Manasota-88
Florida Audubon Society
Save Our Bays Associatio..
Royster Company
Izaak Walton League

Individuals

Dr. Edward A. Martell
Dr. Mary L. Jelks
Mrs. Hilda Quy
Dr. Mary B. Greer
Mr. J. Scott Brown
Mr. Robert A. Lyman
Mrs. Gloria C. Rains

Comments from the Department of the Interior and the Army Corps of Engineers identified two issues which were unresolved in the DEIS, i.e., full compliance with Section 7 of the Endangered Species Act and with Section 106 of the Historic Preservation Act. Since the time of the DEIS publication, EPA has completed the consultation procedures required under each act, and evidence of full compliance is provided in the "Responses to Written Comments" section of the FEIS.

Concerns raised by other Federal agencies were, for the most part, the same as those reflected by state and local government, interest groups and concerned individuals. One such area of concern at all levels in Florida is the problem of increased

potential radiation exposure due to activities of the phosphate industry. The radiation issue as it pertains to phosphate mining is comprised of at least three parts: concern for the occupational safety of phosphate workers, for potential groundwater contamination, and for increased radiation from reclaimed lands, both from radon gas in the case of residential development and from radionuclide introduction into the food chain via agriculture. Although the radiation issue as it relates to the phosphate industry will likely continue to be the subject of study and research and a matter of public concern in Florida for some time, specific radiation questions focused on the Estech site and project have been answered fully in the FEIS "Responses to Written Comments".

Several commenters, at all levels, expressed concern over the uncertainty of successful restoration of wetlands and upland habitat. The categorization of wetlands recommended in the Central Florida Phosphate Industry Areawide EIS was developed in recognition of, and in order to deal with, this question of success of restoration. By this method, the Estech site's most strategically located, functional and otherwise important wetlands were designated as Category 1, to be protected and not mined. This includes the 3/4 mile segment of the East Fork Manatee River originally proposed for mining by Estech. Only Category 2 wetlands, which are considered less functional and vital to the system, may be exposed to the risks that are associated with restoration. It is expected that restoration methodology may improve through knowledge gained from the Category 2 wetlands restoration efforts.

In a similar manner, the 50-acre stand of sand pine scrub is marked for preservation. In any site specific case, including Estech, the precise areas to be preserved and the location of the boundary between Category 1 and Category 2 wetlands designations are a matter of professional judgement and therefore subject to possible disagreement and controversy. Relative quality of wetlands on local and regional scale were weighed in reach g our determination.

The proposed rock drying facility proved to be a very controversial part of Estech's proposed project and EPA's proposed agency action. The seed of this controversy is the recommendation in the Central Florida Phosphate Industry Areawide EIS (Areawide EIS) to eliminate rock drying at beneficiation plants and dry only that rock which must be dried for particular chemical processes. However, as was explained in the DEIS, the Clean Air Act Amendments of 1977 with the resulting BACT and PSD regulations mitigated the study assumptions of the Areawide EIS. The objective of the Areawide EIS to protect air quality can now be attained by an enforceable and pervasive system of air quality controls that exert influence over all major industrial source contributions. Although EPA views the Estech rock dryer issue as resolved, a large segment of the interested public still perceives it as a contradiction to the Areawide EIS and it remains controversial for that reason.

A similar controversy arose with respect to the proposed 480-acre initial aboveground slime pond. The Areawide EIS recommended elimination of such clay disposal areas. It encouraged the use of the most current technology, still being developed, to achieve this objective and recognized the necessity for an initial aboveground slime pond. The Estech proposal and EPA's proposed action entirely conform to the Areawide EIS recommendation. It was the public perception of nonconformance to the first, incomplete part of the recommendation, to "eliminate aboveground slime ponds," which engendered the controversy. The issue was acute in Estech's case due to the location of the Lake Manatee drinking water reservoir downstream of the proposed slime pond.

The County of Sarasota and a few members of the public questioned the objectivity of the third party consultant for the EIS. No information has been presented which alters EPA's confidence in the consultant's objectivity.

6. Unresolved Issues

Two unresolved issues remain. Sarasota County and a few interested citizens objected to any EPA action being taken on the Estech EIS or the NPDES permit application before the local approval issue has been decided. Specifically, Manatee County's denial of the required Development Order and land zoning change for Estech has been appealed by Estech to Florida's Governor and Cabinet sitting as the Land and Water Adjudicatory Board. As part of that process, a state administrative hearing was held in Bradenton, Florida during March and May of this year. Supplemental information generated both as a direct and an indirect result of the hearing is presented and analyzed in the "Supplemental Analyses" section of the Final EIS. At this writing, the Estech appeal has not yet come before the Land and Water Adjudicatory Board. Before EPA issues the NPDES permit, a permit hearing will be held and state certification under Section 401 must be obtained. EPA will assure that the action it takes on the NPDES permit does not undermine the integrity of local land use decision process.

Lastly, the question of long term availability of domestic phosphate resources and their projected depletion by the end of the century was raised by the public in the context of the Estech EIS. A recent report by the U.S. General Accounting Office, entitled "Phosphates--A Case Study of a Valuable Depleting Mineral in America", calls for the development of a national phosphate policy. It is unknown when, or even if, a national policy on phosphates will be forthcoming, but EPA would welcome such policy guidance in reconciling economic, social and environmental values.

7. Agency Decision

The Areawide EIS establishes a basis for initiating a site specific EIS for a new source mining operation. The site specific DEIS examined the mining and reclamation plan by Estech and assessed the impacts of the proposed activities.

The Estech proposal deviated from the Areawide EIS recommendations in two significant areas: 1) construction of a rock drying facility and 2) mining of a segment of the East Fork Manatee River, a Category 1 wetland.

EPA's position on the rock drying facility was discussed in earlier paragraphs. In short, a detailed examination of the short- and long-term, areawide and cumulative effects of the proposed drying facility has shown that air quality standards will not be violated, air quality will not be significantly degraded and sulfur dioxide and particulate matter emissions will satisfy NSPS and BACT. Therefore, EPA intends to approve the rock drying facility and issue the required permits pursuant to provisions of the Clean Air Act.

The segment of the East Fork Manatee River originally proposed for mining has been determined to be a Category 1 wetland. Such wetlands provide important ecological functions such as erosion control, and perform as a living filter by removing sediments and other pollutants from flood waters. In addition, these wetlands are very productive and export a portion of this biological productivity to downstream areas. The efficient functioning of such a complex community is dependent upon the presence of all of its member populations. Restoration of a major, complex floodplain would be slow, if possible at all. Thus EPA recommended in the DEIS that the functioning system be left intact, which would assure preservation of the biological integrity of the floodplain of the East Fork of the Manatee River. Based on the above considerations, EPA believes that mining should not proceed in the East Fork Manatee River. In response to this recommendation, Estech has altered the proposed mining plan to exclude mining of the East Fork Manatee River.

As a result of the Florida administrative hearing process mentioned previously, supplemental information was generated for the Estech proposed project. First, a number of additional soil core samples were taken at various locations on the site and submitted for radiological analyses. The data and an interpretive report on the data are included in the FEIS. The additional information served to confirm the radiological interpretations and conclusions stated in the DEIS.

Analyses of these same core samples also revealed a higher clay to sand ratio than had been predicted for the DEIS. The projected increase in the amount of waste clay to be generated by mining necessitated an increase in the height of the temporary dikes surrounding the sand-clay mix area. The proposed sand-clay dike height change was carefully evaluated to determine its impact, and the statements and conclusions in the DEIS were re-examined in light of the proposed change. This information is presented in detail in the Supplemental Analyses of the FEIS. It is concluded that the impacts identified in the DEIS would not differ significantly as a result of the proposed change.

Therefore, EPA intends to issue an NPDES permit pursuant to the Clean Water Act of 1977. The permit will include as conditions

all those recommendations contained in the Areawide EIS which pertain to mining except the recommendation concerning rock dryers as noted above. The exclusion of the East Fork Manatee River from mining will be assured by inclusion as a permit condition. In addition, the permit will include conditions for protection of endangered species and for protection of an archaeological site. These conditions were generated as a result of the Endangered Species Consultation and Archaeological Consultation. Lastly, the permit will include a condition that the 480-acre initial aboveground slime pond be inactivated and reclaimed a minimum of one year before cessation of mining activities at the proposed mine site.

FINAL ENVIRONMENTAL IMPACT STATEMENT

TABLE OF CONTENTS

		Page
	SUMMARY SHEET FOR ENVIRONMENTAL IMPACT STATEMENT	i
	LIST OF TABLES	xv
	LIST OF FIGURES	xvi
1.0	PREFACE	1
2.0	SUMMARY OF DRAFT ENVIRONMENTAL IMPACT STATEMENT	3
2.1	Introduction	3
2.2	Alternatives Evaluation	4
2.3	Description of the Proposed Activity	22
2.4	Description of Baseline, Impacts, and Mitigating Measures of the Natural Environment	26
2.5	Description of Baseline, Impacts, and Mitigating Measures of the Manmade Environment	44
2.6	Comparison of Proposed Activity with Areawide EIS Recommendations	47
3.0	ERRATA	55
3.1	Draft Environmental Impact Statement	55
3.2	Archaeological and Historical Properties Resource Document	61
3.3	Meteorological Conditions Resource Document	61
3.4	Soils Resource Document	64
3.5	Reclamation Methodology Resource Document	65
3.6	Radiological Environment Resource Document	65
3.7	Surface Water Quality Resource Document	66
3.8	Description of the Proposed Activity Resource Document	74
3.9	Air Quality Resource Document	74
3.10	Alternatives Evaluation Resource Document	76
4.0	SUPPLEMENTAL ANALYSES	102
4.1	Additional Radiological Data	102
4.2	Elevation of Sand-Clay Mix Disposal Height	108
5.0	PUBLIC PARTICIPATION	119
5.1	Written Comments and Responses to Written Comments	120
5.2	Hearing Transcript and Responses to Transcript Comments	296
6.0	LIST OF PREPARERS	404

FINAL ENVIRONMENTAL IMPACT STATEMENT

TABLE OF CONTENTS

		Page
7.0	FINAL EIS COORDINATION LIST	406
8.0	APPENDICES	408
8.1	Draft NPDES Permit	409
8.2	PSD Permit Application - Preliminary Determination	422
8.3	Supplemental Radiological Data	446

FINAL ENVIRONMENTAL IMPACT STATEMENT

LIST OF TABLES

		Page
Table 2.2-A	Resource Recovery Alternatives and Regulatory Constraints	8
Table 2.2-B	Comparison of Mining Method Alternatives	9
Table 2.2-C	Comparison of Ore Transportation Alternatives	10
Table 2.2-D	Comparison of Alternatives for Water Supply	11
Table 2.4-A	Project Emissions	27
Table 2.4-B	Drainage Basin Areas	36
Table 2.4-C	Acreages Before Mining and After Reclamation	42
Table 4.1-A	Critical Values of t	106
Table 4.1-B	Statistical Calculations and Results	107

FINAL ENVIRONMENTAL IMPACT STATEMENT

LIST OF FIGURES

		Page
Figure 2.1-1	Location of Duette Mine	3
Figure 2.2-1	Alternative Plant Site Locations	5
Figure 2.3-1	Master Development Plan with Dragline Sequence	23
Figure 2.4-1	Projected Short Term (24 Hour) Effects of All Stationary Source Particulate Emissions	29
Figure 2.4-2	Subsurface Geology and Groundwater Systems ..	33

1.0 PREFACE

In October of 1979, the Environmental Protection Agency published and distributed a Draft Environmental Impact Statement (DEIS) on the proposed Estech Duette Mine. The DEIS was written pursuant to the National Environmental Policy Act (NEPA). While the DEIS was a complete document, much of the detailed technical information and supporting data were presented in thirteen volumes of resource documents. The DEIS was distributed to the appropriate Federal, State and local agencies and to interested individuals. The resource documents were available for review at a number of locations and were distributed on a limited basis.

This Final Environmental Impact Statement (FEIS) has been prepared to conform with the Council on Environmental Quality (CEQ) regulations (40 CFR Part 6) for implementing NEPA. The essence of the NEPA decision process is contained in the Summary Sheet for the FEIS; it describes the existing problem requiring a decision, summarizes alternatives and their associated impacts, identifies major concerns and issues including areas of controversy and presents conclusions.

In an effort to avoid excessive paperwork and costly reproduction, the DEIS text has not been reprinted in the FEIS. Instead, Chapter 2, Summary of the DEIS, presents the DEIS material in condensed form, with greatest space afforded to the alternatives section. While the Summary of the DEIS is intended to be comprehensive, the supporting information furnished in the DEIS and its thirteen resource documents should be reviewed and is incorporated herein by reference. Chapter 3, Errata, is comprised of the corrections to substantive errors and omissions in the DEIS and resource documents as well as all recognized typographical and minor errors.

Chapter 4, Supplemental Analyses, presents two significant additional areas of information developed subsequent to the DEIS. Additional radiological data were collected to provide an expanded data base for the proposed project site. The Supplemental Analyses chapter presents an evaluation of these data and their effect on

the findings and conclusions in the DEIS. Secondly, a revision in the original proposed waste disposal plan, namely the height of the sand-clay mix disposal areas, is described and evaluated.

Chapter 5 contains a description of the public participation program conducted for the EIS. Included in this chapter are copies of written communications submitted to EPA in response to the DEIS, followed by EPA's responses to each individual comment. These are followed by a transcript of the public hearing on the DEIS and a point by point response to the hearing comments.

The final chapters of the FEIS identify the individuals involved in its preparation and the agencies and groups to whom the FEIS will be sent for review and comment. Appendices to the FEIS contain the draft NPDES permit, EPA's Preliminary Determination on the PSD permit application and the additional radiological data mentioned previously.

In accordance with CEQ regulations, there will be a thirty day review and comment period following publication of this FEIS and its filing with the CEQ.

2.0 SUMMARY OF DRAFT ENVIRONMENTAL IMPACT STATEMENT

2.1 INTRODUCTION

Estech General Chemicals Corporation proposes a phosphate mining and beneficiation facility at the Duette Mine in Northeastern Manatee County, Florida (Figure 2.1-1). The operation encompasses 10,394 acres, of which 6,600 acres are deemed minable. The operation is planned to produce three million tons of ore annually for 21 years. Construction of the facility is scheduled for 1980 with mining beginning two years later.

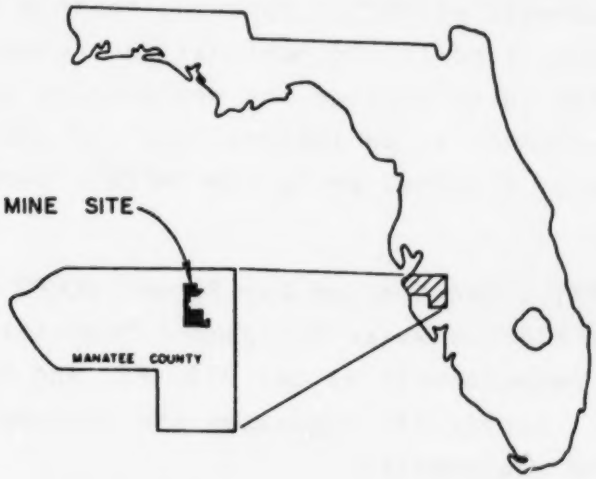

Figure 2.1-1 Location of Duette Mine

The water management plan divides the needed supply between surface water and groundwater resources, minimizes process consumption, and provides for recharge of the Floridan Aquifer. Discharges of water will be minimized and monitored for compliance with regulatory requirements.

The reclamation plan is primarily intended to return the site to agricultural uses. The plan proposes preservation of certain important wetland and upland plant communities and reclamation to wetlands. Wetland preservation and reclamation areas were incorporated to provide long-range water quality and biological

diversity as well as land form diversity, wildlife protection, recreational uses and water resources.

In April 1978, the Application for Development Appproval was filed with Tampa Bay Regional Planning Council (the State designated regional planning agency) and Manatee County Planning and Development Department (the designated local agency having jurisdiction) to secure proper zoning. In addition, a Master Mining Plan, as required by Section III Manatee County Mining Ordinance, was submitted to the local agency.

In May 1978, the Duette Mine was determined by EPA to be a new source as defined in Sec. 306 of the Federal Water Pollution Control Act Amendments of 1972. Pursuant to this determination, the procedures specified in the National Environmental Policy Act were initiated which include the preparation of an environmental impact statement as an integral part of the National Pollutant Discharge Elimination System (NPDES) permit application.

In September 1978, a Consumptive Use Permit (CUP) was issued by the Southwest Florida Water Management District (SWFWMD) pursuant to the requirements of Ch. 373, FS. and Ch. 16J-2, FAC. This state permit explicitly regulates the consumptive use of surface water and groundwater.

2.2 ALTERNATIVES EVALUATION

Alternative evaluation included assessment of plant site locations, production rate, resource recovery, processes for mining and beneficiation, water supply, waste disposal and reclamation techniques, discharge into surface water, rock drying, product transportation to port, power sources and no-action.

Plant Site Alternatives

Beneficiation plant sites were evaluated to minimize loss of phosphate resource, water pumping, ore and waste transportation,

road and utility construction and destruction of environmentally sensitive areas. Six sites were considered and are shown in Figure 2.2-1. Site 6 is the applicant's proposed plant site location.

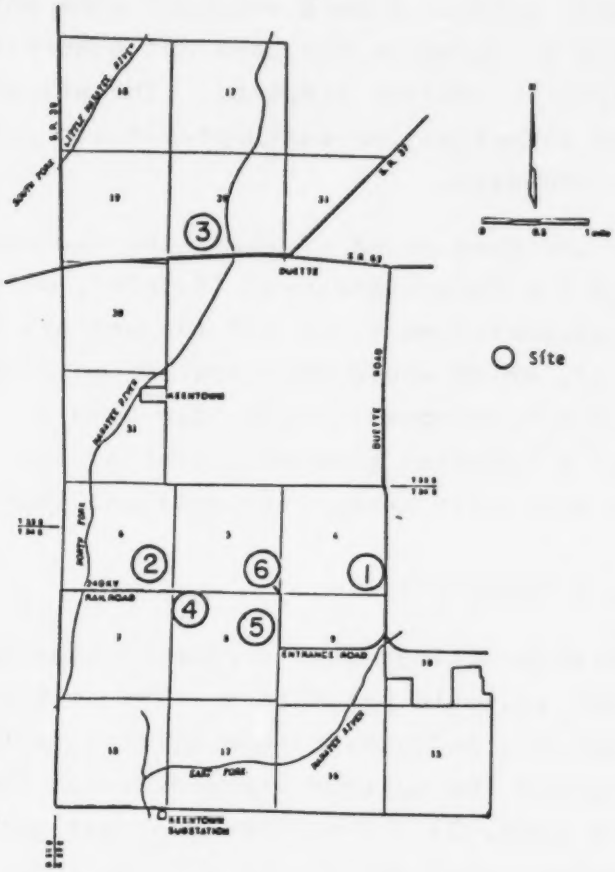

Figure 2.2-1 Alternative Plant Site Locations

Resource losses associated with alternative sites are: Site 1 - 511,500 tons; Site 2 - 0 tons; Site 3 - 2.325 million tons; Site 4 - 1.6 million tons; Site 5 - 1.6 million tons; Site 6 - 0 tons. The lowest net energy costs result from locating the plant site at the center of the ore body (Site 4). Offsetting the energy savings in sites 4 and 5 is the resource loss. Sites 4 and 5 have essentially the same environmental ramifications as the proposed location (Site 6). Site 3 exhibits the greatest potential for disburbance of wooded floodplains preserved as

a wildlife corridor and for damaging aquatic habitat due to minor spills and surface water withdrawal. This site also necessitates destruction of the environmentally sensitive, 18 acre cypress dome. It may also result in unacceptable noise levels at sensitive receptor sites. Site 2 exhibits some potential for wooded floodplain disturbance but does not otherwise differ significantly from the Estech proposal. The primary constraint on Site 1 is the potential for unacceptable air pollutant levels at the property boundary.

From the energy and cost point of view, the two most feasible alternatives are the Estech proposal (Site 6), which would minimize ore transportation costs and the western boundary location (Site 2), which would have smaller material transportation and development costs than Site 6. Site 2 does, however, exhibit a somewhat greater potential for damage to environmentally sensitive areas (floodplains) than Site 6.

Production Rate Alternatives

Production rate alternatives were evaluated considering both environmental and economic parameters. The alternatives selected to illustrate various production rate effects rather than to definitely designate the optimum are production rates of 1) 1.5 million tons per year, 2) 3.0 million tons per year (applicant's proposed production rate) and 3) 4.5 million tons per year.

Consideration of environmental aspects indicate all alternatives would have essentially the same long-term effects on vegetation and wildlife. Positive aspects of alternative one are that lower groundwater withdrawal rates would cause the least stress on regional water resources and annual particulate emissions would be lowest. Annual SO_2 emissions would be largely the same for alternative one and two but the long-term contributions of one would be twice that of alternative two. Alternative three has a considerable potential to exceed groundwater withdrawal limitations and exhibits the highest air pollutant contributions.

Alternative one is a 10.7% reduction from present production. Alternative two replaces mined out production and provides for demand growth of the phosphate industry. Alternative three is excessive in that it is decidedly more than necessary to replace existing capacity and is in excess of historical growth rates.

In terms of both environmental considerations and production capability, it appears that Estech's proposed production rate has been reasonably selected.

Resource Recovery Alternatives

Resource recovery alternatives were evaluated with consideration given to impacts on environmental resources and recovery of mineral resources. The primary consideration was phosphate ore underlying forested swamps or marsh areas.

Three cases of resource recovery are considered. Case 1, the proposed action, represents the mining and reclamation plan (originally proposed) by Estech. Resource recovery of this plan would be about 61.5 million product tons of phosphate rock recovered over a 20-21 year mining period. In achievement of the proposed recovery, Estech has excluded the lower quality "unmineable" ore and ore of varying quality underlying much of the forested swamp community found along major water courses and the cypress dome. Case 1 includes mining approximately 360 of the 600 acres of freshwater marsh, 55 acres of the East Fork Manatee River and most of the small feeder streams. (Note: In the FEIS, Estech has revised its proposed action to exclude mining in the East Fork of the Manatee River.)

Case 2 excludes the mining of all freshwater swamp but includes mining of marshes as in Case 1. Resource recovery would be about 57.65 million product tons of phosphate recovered over a 19-20 year mining period.

Case 3 includes recovery of all phosphate rock resources regardless of vegetative cover or current land use. Resource recovery would be about 65.9 million product tons of phosphate recovered

over a 21 1/2 - 22 1/2 year mining period. The case includes mining of approximately 950 acres of forested swamps (including most of swamp along major drainage courses and the cypress dome) and mining of marshes as in the previous case.

Table 2.2-A shows the relationship between resource recovery cost and regulatory constraints.

Table 2.2-A Resource Recovery Alternatives and Regulatory Constraints

Change in Resource Recovery	Change in Cost	Meets Regulatory Constraints
Case I - Proposed Action	-0-	Permit required for East Fork Manatee River System
Case 2 - Loss of 3,850,000 tons	Would create slightly higher depreciaiton rate to account for the resource loss	Would meet maximum constraints regarding wetland protection
Case 3 - Add 4,400,000 tons rock	Any mitigative action would add to costs	Would require approval of DER and Corps of Engineers

With regard to the relationship between resource recovery and potential adverse impacts on marsh-type systems, for all cases, freshwater marsh re-establishment through reclamation is expected to be a relatively rapid process even when unassisted.

Concerning the balance between resource recovery and potential impacts related to mining of freshwater swamps, each alternative offers distinctly different implications. Case 2 represents the "least risk" alternative as all wooded wetlands, regardless of importance, would be maintained intact. This would defer for an undetermined time the recovery of several million tons of phosphate rock product over the other alternatives. Case 3, on the other extreme, offers maximum resource recovery but with the potential of incurring highly significant, high magnitude adverse effects on all important biologic and hydrologic systems if freshwater swamp regrowth is unsuccessful. Case 1, not necessarily intermediate to the extremes, also offers

the possibility of moderately significant, high magnitude adverse effects if freshwater swamp regrowth is unsuccessful in the mined, three-quarter mile segment of the East Fork Manatee River.

The current optimal alternative would appear to be somewhere between Case 1 - Proposed Action and Case 2 - Swamp Exclusion as large scale wooded wetland restoration efforts are unproven. Case 2 includes preservation of some wooded wetlands that are isolated and/or normally intermittent in nature and exhibit insignificant or minor hydrologic and biologic functions. Conversely, Case 1 proposes mining of largely undisturbed, heavily wooded floodplains that contribute significantly to the overall hydrologic and biologic functioning of the site and general area. (Note: Case 1, representing Estech's proposed action, has been revised in the FEIS to exclude mining of the East Fork of the Manatee River.)

Mining Method Alternatives

Mining methods were evaluated to assess ore recovery rates, energy use, water use and conservation, environmental resources and safety. Alternatives examined were electric draglines (Estech's proposal), dredges, bucket wheel excavators and technique combinations.

Table 2.2-B Comparison of Mining Method Alternatives

Item/Case	Dragline	Dredge	Wheels	Combination
Environmental	E	E	E	E
Water	B	S	B	S
Energy Use, KHW/Ton	12.6	25.0	21.7	22.9
Ore Recovery	85-87%	80-82%	88%+	88%+
Safety	S	S	P	P
Cost, $/Ton, Prod.	1.30	1.38	1.99	1.38

Ratings: B-Best, S-Satisfactory, P-Poor, E-Equal

Based on the tabular comparison, the dragline would be preferred although dredging would be acceptable.

Ore Transportation Alternatives

Ore transportation alternatives were evaluated considering environmental impacts, technical and operational feasibility, cost, energy use, and water conservation. Conventional slurry pumping (Estech's proposal), conveyors and trucks were transportation methods considered.

Table 2.2-C Comparison of Ore Transportation Alternatives

Item/Case	Pumping	Conveying	Trucking
Environment	S	B	P
Water	E	E	E
Energy Use, KWH/Ton	17.3	11.2	N/A
Operational Feasibility	S	U/P	P
Cost $/ton, Product	$ 0.92	$ 0.88	$ 1.33

Rates: B-Best, S-Satisfactory, P-Poor, E-Equal
U/P-Unproven in phosphate. Energy use (KWH) for trucking is included in the Cost $/ton.

Concerning the environmental ratings, pumping and conveying alternatives would each eliminate about 15-20 acres of wetland vegetation due to construction of stream crossings. It is assumed the construction of truck crossings would eliminate some greater amount due to the need for heavy duty bridges on pilings or culverts with approach fill.

The pumping and conveyor alternatives each offer a potential for spillage of transported materials at stream crossings. Extensive spills of truck transported materials into streams is considered remote. The greatest potential for adverse effects related downstream sedimentation by spill materials would appear to be associated with pipe-wall rupture in the pumping alternative if secondary protective measures fail. The only alternative with significant implications for addition to air pollutant burdens is the truck transportation alternative.

The operational viability of transport of ore by conveyor is unproven. The problem associated with transferring the ore from the dragline to the conveyor and the need to relocate the conveyor continuously as mining advances are significant disadvantages of the conveyor transport method. The continuing

increase in power cost makes further study of this alternative prudent. However, in view of the proven reliability of pumping and its compatability with the dragline and dredge mining alternatives, the ore pumping alternative is currently the most satisfactory ore transport method.

Benefication Process Alternatives

Beneficiation process alternatives were evaluated for energy and water use efficiencies within proven state-of-the-art technology. Alternative processes considered were conventional beneficiation, total acidulation and blast furnace. The total acidulation process (direct acid conversion of matrix) is only experimental and not available for use at this time. Furnace alternatives (high temperature decomposition) are cost and energy intensive and unsatisfactory for this ore body. Thus, conventional beneficiation is considered optimum.

Process Water Source Alternatives

Process water sources were evaluated to conserve the regional resource while providing a sufficient quality and quantity of water. Supply alternatives considered were use of surface water and groundwater, total requirement from the Floridan Aquifer, use of surface water in rainfall catchment and use of water from the surficial aquifer.

Table 2.2-D Comparison of Alternatives for Water Supply

Alt.	Quality*	Dependability	Resource Impact
Alt. #1	Excellent G/W Poor S/W	Dependable	G/W and S/W
Alt. #2	Excellent	Dependable	G/W only
Atl. #3	Poor	Not dependable	S/W vegetative system & downstream use
Alt. #4	Excellent	Not dependable	Vegetative impact

* Quality is expressed in relative usefulness in the amine circuit of the flotation system.

Estech's proposal (Alternative 1) uses both groundwater and surface water. This alternative provides fr a dependable source of sufficient high quality water for the beneficiation process and reduces the impact on the deep aquifer compared to the exclusive use of groundwater (Alternative 2).

Alternative 2 (Floridan Aquifer) impacts only the groundwater resource in the deep aquifer. This alternative provides for a dependable source of high quality water. The impacts of groundwater pumping are acceptable for the first three years, but for the long term, Alternative 1 is preferred because of its reduced impact on the deep aquifer.

Alternative 3 (rainfall catchment) is not acceptable in terms of water quality or dependability. In addition, this alternative has the potential of reducing the downstream surface water supply, would destroy hardwood floodplains by reservoir construction and has not been proven technically feasible.

Alternative 4 (surficial aquifer) would not provide a dependable source of water. In addition, this alternative would have an adverse impact on the maintained vegetation on site because of drought conditions impoased on the surface soils for the 20-year mining period.

In view of these considerations, Estech's proposal is the optimum blend of various resource uses. The mitigative action of implementing recharge wells makes this alternative even more attractive.

Waste Disposal/Reclamation Alternatives

The objective of the waste disposal/reclamation plan is to restore disturbed land to a productive state, considering both existing and created environmental systems. Considering all three levels of alternative selection - waste disposal, physical restoration and revegetation, a set of the alternatives capable of meeting the applicant's goals can be established. Two cases have been selected for final comparison.

Case I - Case I may be described as the best case application of conventional waste disposal and reclamation techniques. Under this case, clay and sand wastes would be disposed of in separate areas. Except for the required initial clay settling area on natural ground, waste disposal would be confined to mined-out areas. This requires the construction of approximately 3,604 acres of conventional clay settling areas with dams averaging 50 feet in height, of which 480 acres would be on natural ground. The remaining 3,500 acres of mined-out land would be used for sand tailings disposal.

All clay settling areas would be reclaimed by the crust development technique so as to leave the clays in the surface soil. Sand tailings landfills would be capped with overburden to an approximate depth of two feet. It was assumed that reclamation of the approximately 255 acres required for the plant site and support facilities would be the same for both cases.

All reclaimed areas initially would be planted in forage species. As is frequently practiced, scattered tree plantings would be made in reclaimed pasture areas at a density of two trees per acre, of which half would be 2"-4" transplants and half would be potted seedlings. Since wetland restoration is not currently part of conventional reclamation technology, it was assumed that no areas would be restored as wetlands. Also, no areas would be allowed with mininal reclamation to revegetate naturally since this is at variance with current local and state reclamation standards.

Case II - Case II is the Estech plan. Under this plan, the sand-clay mix technique is the primary waste disposal method, requiring a total of 5,426 acres, of which all but 200 acres are in mined-out areas. An initial 480-acre conventional clay settling area with a dam height of 30 feet is required on unmined land. Approximately 848 acres of conventional sand tailings disposal areas in mined-out pits are also elected. The remaining 574 acres of mined-out land is not utilized for waste disposal.

All sand-clay landfills are reclaimed without the use of capping material. The single clay settling area is reclaimed by the crust development technique and sand tailings disposal areas are capped with approximately two feet of overburden. The acreage not required for waste disposal is reclaimed as land and lake areas. Of this 574 acres, shallow zones amenable to marsh establishment would be created on approximately 90 acres along the margins of four reclaimed lakes and a 100-acre area would be physically altered only by the partial leveling of spoils to provide an area for natural revegetation. The 255 acres required by the plant site and support facilities will be physically reclaimed by conventional means of dismantling facilities, grading to approved slopes, etc.

Revegetation plans for Case II include the planting of 5,928 acres of improved pasture with a mixture of grass and legume species. Mixed forest strips totalling approximately 58 acres would be planted in upland reclaimed pasture areas. Approximately 485 acres of forested wetland would be planted, primarily along major drainage swales and also along a restored segment of the East Fork Manatee River. (Note: In the FEIS, Estech has revised its proposed action to exclude mining in the East Fork Manatee River.) Approximately 538 acres of shallow aquatic environments created in sand-clay landfills would be allowed to revegetate naturally. Along with the 90 acres of shallow zones created in the margins of reclaimed lakes, this constitutes a total planned marsh restoration of 628 acres. The 100-acre land and lake area subjected to only partial spoil grading would be allowed to revegetate naturally. All the land areas associated with the remaining 384 acres of land and lake areas would be grassed.

In Case II, the approximately 5,400 acres of sand-clay spoils are projected to be more productive than the soils which result from conventional waste disposal/reclamation techniques. Moreover, under Case II, disturbed land will be returned to a

productive use at an earlier date than for the conventional waste disposal case.

The risk of a dam failure and its resulting environment damage is greater in Case I. Case II has the most obvious advantage over Case I in the area of revegetation efforts to mitigate the loss of natural communities to mining. In Case I, all reclaimed areas would be improved pasture resulting in a permanent loss of 364 acres of marsh and 476 acres of swamp. As river swamps and marshes were found to be the most productive wildlife habitats of the site, the reduction would significantly reduce the long-term carrying capacity of the mine site. In Case II, a variety of revegetation efforts are proposed to attempt re-establishment of destroyed wetland habitats. The Case II planned restoration of over 1,100 acres of wetlands represent a significant contribution towards mitigating adverse impacts of mining on local wildlife populations. Additionally, reforestation strips (hedgerows) in upland areas and abandonment of a minimally reclaimed 100 acre area will provide areas of wildlife habitat not available in Case I.

The advantages of Case II appear to justify the added costs this alternative imposes over the more conventional Case I alternative. Case II, therefore, may be designated as the optimum alternative. Due to the conceptual basis of the plan, it is expected that modifications will be made (in practice) in response to more detailed engineering and to variables in actual operations.

Surface Water Discharge Volume Alternatives

The alternatives considered were 1) containment of long-term accumulation, 2) containment of short-term accumulation, 3) containment to offset evaporation losses and 4) no containment. Alternative three represents Estech's proposed action.

Alternative one and alternative two possess the potential for dike failure. A resource loss would also be incurred due to

the construction of impoundments over areas containing mineable phosphate ore. Neither water conservation nor reduced potential for surface water degradation is deemed sufficient to offset the previously mentioned negative attributes. The selection of the third alternative, however, does not completely define it as the optimum possible system. Improvements or modifications possibly can be implemented by Estech, during design or operation, to further feasibly reduce discharge. Alternative four would require additional water to be obtained from either the rivers or deepwells.

Discharge Point Alternatives

Alternatives were assessed with respect to maximizing water conservation and water management efficiency while meeting water quality standards for the receiving waters. The alternatives considered were: 1) discharge directly into East and North Fork Manatee River; 2) discharge directly into North Fork and into pool connected to East Fork Manatee River; 3) discharge directly into North Fork, into river overflow pool when not full, and directly into East Fork when river overflow pool is full; 4) discharge directly into East Fork Manatee River; 5) discharge into river overflow pool connected to the East Fork; 6) discharge directly into East Fork Manatee River when overflow pool is full; 7) discharge directly into North Fork Manatee River; and 8) deepwell injection of all discharge water. Alternative three represents Estech's proposal.

Alternative eight is unacceptable because of increased risk of contaminating groundwater. Assuming they meet water quality standards, all other alternatives appear acceptable. Both alternatives two and three maximize water efficiency and minimize discharge, although alternative two is more cost effective. The cost difference is, however, off-set by operational effectiveness of discharge flexibility inherent in alternative three.

Rock Drying Alternatives

The objective is to prepare the phosphate rock for shipment in a condition acceptable to customers while meeting regulatory requirements regarding air pollution. The alternatives selected for assessment are: 1) install rock dryer at the Duette Mine (Proposed Action); 2) ship wet rock; 3) use existing dryer at remote location; and 4) install rock dryer at a remote location.

Total acceptance of wet rock, as the basic form of the phosphate rock commodity on the world market, is not expected for some time. Many users have small phosphoric acid plants and the designs vary widely making conversion to wet rock not only expensive, but technically difficult. Conversion to wet rock also requires installation of wet rock grinding in addition to major wet phosphoric acid process design changes. Capital for the modifications is not readily available in many developing countries.

Some dry rock is used to produce triple superphosphate for which no wet rock process exists. If drying at the acid plant is desired, small dryers located at small plants are inefficient and very expensive compared to the large units employed by rock producers.

More energy in the form of fuel oil is consumed to dry the rock than is consumed to ship the additional water in the wet rock, assuming that the rock will not be dried at the final destination. In the case of rock dried at the final destination, energy consumption would be the greatest since the energy consumed in shipping the water would be added to the energy consumed in drying the rock.

From an environmental viewpoint, a ranking of alternatives from best to worst may be characterized and summarized as follows:

- Ship Wet Rock - This is the best environmental choice only if the rock is not dried in less efficient and less effectively controlled equipment at the destination. However, from a standpoint of phosphate rock customer requirements, it is, in effect, also a no project alternative.

With a gradual shift to wet rock grinding and processing facilities, wet rock shipping may eventually be demonstrated as reasonably practical and a preferred environmental alternate.

- New Dryer at Remote Site - It is assumed that the site would be within a developed port facility of the region. Also it is assumed that the air and water quality conditions at the remote site are sufficiently marginal with respect to standards and that the required additional level of emission control would reduce pollutant contribution to the regional pollutant burden and produce a better environmental choice. For example, the best site would be within an area designated for non attainment, because the new source would have to negotiate at least a corresponding reduction from another source so that there would be a projected reduction in area emissions.

- Dryer at Duette Mine (Proposed Action) - It is required that this new facility be designed, constructed and operated in accordance with the existing body of environmental legislation and regulations designed to protect the public health and welfare. It must be recognized that the environment analyses suggest these requirements can be satisfied, and in some cases, with considerable margin. Thus, the alternative is considered an environmentally acceptable action.

- Use Existing Dryer at Remote Location - Continued or expanded use of older, less effectively controlled equipment located in areas marginal with respect to air quality standards would increase regional pollutant burdens.

Both wet and dry phosphate rock are minor gamma radiation sources, and there is no measurable difference in radiation levels between the two products. Lung dosages of radiation are higher near rock dryers, but conventional dust control systems maintain radiation levels within the guidelines for occupational exposures. The application would reduce pollutant concentration levels even further. Workers near adequately ventilated wet and dry rock handling facilities, generally are not exposed to radiation levels exceeding the guidelines for the general population.

Pollutant Control System Selection - Prevention of Significant Deterioration (PSD) regulations include a requirement for application of Best Available Control Technology (BACT) to major source developments. BACT is a formalized analysis of

potentially appliable control systems and a final selection based on performance (i.e., pollutant removal efficiency), economics (i.e., capital and operating costs) and irretrievable energy requirements. The process is completed following regulatory approval of the control concept and issuance of a BACT Determination.

A preliminary evaluation of pollution control systems narrowed the evaluation to two practical alternatives for both the dryer facilities and fugitive dust control systems--fabric filtration (baghouses) and wet scrubbing technologies. A review of the advantages and disadvantages of the pollution control systems lead to the selection of the proposed venturi-absorbers and wet centripetal vortex contact scrubbers.

Product Transportation Alternatives

The transportation objective is to ship the phosphate rock to local or port destination as efficiently and safely as possible with minimum disruption. The alternatives selected for assessment are: 1) railroad with truck as emergency mode (Proposed Action); 2) trucks only; 3) pipeline to port; and 4) conveyor belt.

The presently feasible alternatives for transportation of the phosphate rock to the port facilities in the Tampa Bay area appear to be that of railroads and/or trucks. Both the pipeline and conveyor belt alternatives present the significant problems of obtaining a continuous zone of right-of-way and/or land purchase for a route to a port and prohibitive capital costs for construction. The truck alternative will use more energy, but in some cases, has a higher reliability. However, it has environmental constraints in the form of vehicular emissions not only from the truck traffic itself but also from the contributions from any associated traffic connections which might be expected from such a large volume of trucks required. Railroads are established in Central Florida and they are reliable. Presently, rail is the most economical transportation available

because it uses less energy and is generally environmentally acceptable.

Energy Source Alternatives

The objective is to maintain maximum efficiency in energy conservation while minimizing environmental disruption.

Energy source alternatives assessed are: 1) commercially available electric power (Proposed Action); 2) on-site coal, oil, gas powered generator; 3) on-site nuclear power generator; 4) on-site solar power generator; and 5) on-site hydroelectric generators.

On-site generation by coal, oil, or gas would result in additional significant environmental considerations in addition to those associated with mining. Special measures would have to be taken to insure a non-polluting energy system. The cost of construction and operation of on-site generation are considered prohibitive. With the exception of a reduction in air pollution, the nuclear generation alternative alternative has the same drawbacks as generation by coal, oil, or gas. In addition, strict control of the fuel and security for fuel waste disposal would have to be resolved. Current solar power technology has not advanced to the point where sufficient electrical energy could be obtained from the sun to satisfy mine requirements on a practical, non-interruptable economic basis. None of the streams on the property are capable of supplying the needed steady water flow to provide the mine's electrical requirements through hydroelectric generators. Therefore, the only feasible alternative is to purchase the required power from a commercial producer.

No-Action Alternatives

The no-action alternative would be to not construct the proposed New Source on the Duette tract and to allow the area to continue its present day socioeconomic and environmental trends.

Basline elements indicate that failure to construct and operate the proposed new source would exert little effect, positively or negatively, on general regional or local projections for population growth, econimic growth or demands for community services and facilities.

The general result of the no-action alternative on socioeconomic conditions of the region and specifically Manatee County would, in effect, be one of unrealized potential economic benefits.

Economic benefits of the proposed mine would be about $4.5 million in local property and state severance taxes with no appreciable effects exerted on public services, facilities, etc. Additionally, the projected $25 million annual expenditures by Estech for products and services would not be realized. The no-action alternative would represent the loss of 61.5 million tons of phosphate rock resources.

The present day general trend for eastern, rural Manatee County to be largely devoted to agricultural activities is not expected to change in the foreseeable future. The only noticeable change to this trend, which is viewed as temporary in nature, is the approval of two phosphate mines in eastern Manatee County as Existing Sources. The two approved mines, neither of which are presently in operation, are located immediately north and south of the Estech Duette tract.

In the absence of mining on the Duette tract, it is expected that little physical modification of the tract will occur over the next two decades. Because of the relatively poor soil conditions at the Duette tract, it is unlikely that the native rangeland (cut-over flatwoods), which comprise the majority of the site, would be rapidly converted to improved agricultural uses. The practice of clearing native rangeland for production of watermelon and/or tomato crops for a few seasons may result in several hundred acres eventually converted to improved pasture. This conversion of a hundred acres of the tract to pasture should not exert significant adverse impacts on the

biology and ecology of the site. As current land clearing practices for improved agricultural use typically avoid wet soils due to the impracticality of its use as pasture or for row crops, significant destruction of wetlands on the tract is not expected.

If additional acreage is cleared for row crops and/or improved pasture as assumed, irrigation requirements would probably result in average annual withdrawals of groundwater approaching that proposed for mining. These withdrawals would be confined to the dry season only, however, and probably would result in worst case aquifer drawdowns exceeding those associated with mining on the tract.

In the no-action alternative, therefore, most if not all unavoidable adverse environmental impacts, associated with mining would not occur. The existing natural setting would continue more or less unchanged. A projected benefit associated with mining and reclamation, the improvement of soil quality and productivity potential, would also not accrue.

2.3 DESCRIPTION OF PROPOSED ACTIVITY

Estech proposes to use equipment and design generally available and practiced by presently operating mines. The major components of operation are large walking draglines; hydraulic ore transportation via pipeline to a central washer; a feed preparation and flotation plant; wet rock storage and drying; and shipment via rail.

The draglines strip overburden for deposit in mined-out cuts. Exposed matrix is excavated and dumped into a slurry pit or "well" -- an excavated sump within reach of the dragline. A pit control car directs high pressure water guns at the matrix breaking it into a slurry. Pumping systems deliver the slurried matrix to the plant.

Slurried matrix is passed through a wet screening process. Unacceptable pebble is discarded as waste. Product is stored in

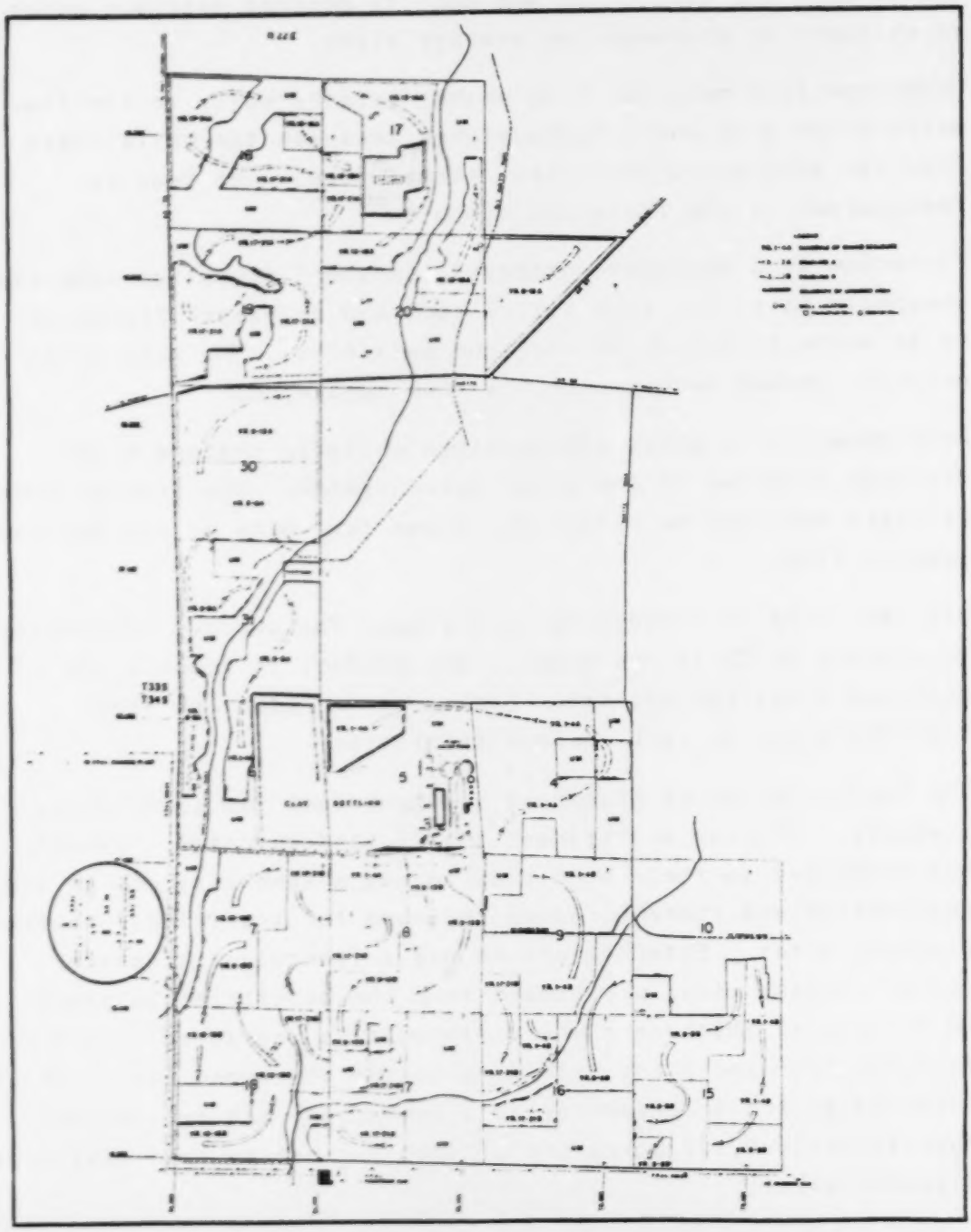

FIGURE 2.3-1

MASTER DEVELOPMENT PLAN WITH DRAGLINE SEQUENCE

SOURCE ZELLARS - WILLIAMS, INC.

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PROPOSED DUETTE MINE
MANATEE COUNTY, FLORIDA

pebble bins for dewatering and quality control analysis prior to shipment or placement on storage piles.

Underflow fine material from washer screens moves to the feed preparation area where hydrocylones separate the waste clays from the sand-sized particles, termed feed. The feed is transported to the flotation circuit.

Flotation is a two-stage process; "rougher" flotation separates phosphate particles from silica sand and "cleaner" flotation by an amine flotation of tne sand particles. The sand-sized product, termed concentrate, is then dewatered.

Rock dewaters to about 13% moisture while in storage with drainage directed to the plant water system. The storage system delivers wet rock to either the dryer feed bins or the wet rock loadout bins.

The last step in processing is drying. The average 13% moisture is reduced to 2% in the dryer. Dry product is transferred to concrete silos for storage. Conveyors transfer dry rock from the silos to rail loadout facilities.

The beneficiation of phosphate ore generates two solid waste products: 1) clay or "slimes" and 2) sand tailings. Estech has committed in their mine plan to use a sand-clay mix in land reclamation and thereby reduce the need for traditional separate disposal areas. Estech plans to use a flocculant thickener method whereby clays are pumped from the beneficiation plant to mechanical thickeners where flocculants are added. Sand tailings from the plant are added to the thickened clays either directly at the thickener or at a downstream mixing station. Approximately 5,426 acres are planned for use as sand-clay type disposal areas.

A 480-acre conventional clay settling area is planned for the mine. This area will receive all clay wastes generated before the sand-clay mix procedure becomes operational. The settling area will remain active throughout the mine life to receive clay

wastes in excess of the sand-clay mix requirements and to serve as a secondary water clarification and storage area. By the end of the mine life, the area will be filled to about 25 feet above natural grade.

In the first year of mining, sand tailings will be used to construct retaining dikes. Thereafter, about 42 acres per year will be backfilled with tailings for a total of 848 acres.

The proposed water management plan divides the needed supply between surface and groundwater resources, minimizes mining process consumption and provides for recharge of the Floridan Aquifer. The Consumptive Use Permit issued by the Southwest Florida Water Management District allows groundwater withdrawal at a rate of 13 mgd for the first three years. During this time, a 200-acre surface water reservoir will be constructed to provide storage for 3 mgd, thereby decreasing groundwater use to 10 mgd. Prior to withdrawal, a recharge system will be constructed to transmit water from the surficial aquifer into the deep system.

With the exception of a 100-acre area, all land disturbed by the operation will be reconstructed and/or backfilled with waste materials in conformance with county and state slope requirements. In sand-clay mix landfills, the exterior levees and any protruding spoil piles will be graded down. In the clay settling area, the formation of a surface crest will be encouraged by use of perimeter and interior ditches. When the crust has formed, the retaining dike will be pushed down. In sand tailings landfills, the overburden in the protruding spoils will be distributed over the landfill to an average depth of two feet.

In land and lake areas, the spoils will be graded to conform with terrestrial slope requirements and to form littoral zones consisting of 12 to 1 subaqueous slopes out to a depth of 6 feet.

In addition to primary physical restoration techniques, several special techniques are planned to serve particular reclamation

goals. A three-quarter mile segment of the East Fork Manatee River is proposed to be restored by creation of an adjacent hardwood vegetated floodplain and channel with the same elevation and gradient as the existing stream. (Note: Estech has revised its proposed activity to exclude mining of the East Fork of the Manatee River.)

Shallow basins allowed to form around the drainage outlets in sand-clay landfills will be retained as marsh environments. Drainage swales will be constructed through adjacent sand-clay landfills to interconnect these marshes.

About 6,000 acres of reclaimed land will be planted to forage grasses and legumes. Forage species will be selected to match the potential productivity of each reclaimed soil type. Reforestation in upland areas will include mixed plantings of native species such as water oak, live oak, longleaf pine and slash pine. The shallow basins created in sand-clay landfills are expected to revegetate naturally with marsh-type vegetation. The minimally reclaimed 100-acre land and lake area will also be allowed to revegetate naturally.

Contouring and revegetation of land and lake areas is estimated to require two years to complete. Backfilling with sand tailings, capping with overburden and revegetation will require about three years. In sand-clay landfills, two years has been allotted to filling, two years to subsidence and consolidation and an additional year to revegetation, for a total of five years to complete reclamation. Because of the lengthy period required to form a surface crust, ten years has been allotted to complete reclamation of the single clay settling area.

2.4 DESCRIPTION OF BASELINE, IMPACTS, AND MITIGATING MEASURES OF THE NATURAL ENVIRONMENT

Meteorological Conditions

Meteorological conditions discussed include temperature, precipitation, evaporation, dispersion phenomena, hurricane, tornado and hailstorm frequency and thunderstorm activity.

Air Quality

The analysis of proposed air quality impact was performed in a manner consistent with objectives of Prevention of Significant Deterioration (PSD) and includes results of preconstruction monitoring activities, control equipment selection to achieve BACT, emissions estimates and mathematical modeling to insure conformance with PSD increments and National Ambient Air Quality Standards (NAAQS). (Note: See PSD Preliminary Determination in Appendix B of the FEIS.)

Project emission estimates are given in Table 2.4-A and include both construction and operating emissions. The construction estimates display a worst day representation with all activities overlapping at one time. The data from which these estimates were computed formed the basis for modeling source effect.

Table 2.4-A Project Emissions (Pounds Per Day)

Phase/Pollutant	TSP	Fugitive Dust	HC	NO_x	SO_2	CO	Gaseous Fluoride
Temporary/Construction							
Site Preparation	80	--	110	20	nil	660	--
Construction	60	550[a]	90	1,000	60	460	--
TOTAL	140	550[a]	200	1,020	60	1,120	--
Operation/Mining and Processing							
Mining	10	850[a]	11	156	77	50	--
Wet Rock Storage	--	1,350[a,b]	--	--	--	--	--
Dryers	551	nil	37[c]	1,319[d]	206	185[c]	1
Dry Rock Storage and Transport	279	nil	--	--	--	--	--
Transportation (auto/truck/R.R.)	3	--	20	46	6	108	--
TOTAL	843	2,200[a,b]	68[c]	2,021	289	343[c]	1

[a] Fugitive dust emissions include a substantial weight percent of coarse particulate matter (unlike dryer emissions) that will redeposit relatively close to the point of emission.

Table 2.4-A (continued)

[b] Analysis of product particle size suggests methodology produces substantial overestimation (99.98% >40 μm).

[c] Pollutant loadings generated by fuel combustion process for equivalent industrial boiler capacity. Reduced generation and/or removal may be expected in fluidized bed dryers and wet scrubbing devices.

[d] Based on field measurements conducted on a similar fluosolids dryer.

Annual total suspended particulate long-term effects of just the proposed source were determined using the AQDM computer code. The maximum effect occurs well within the confines of the mine. The highest property boundary effect occurs on the west boundary. Annual concentration at the point of maximum effect was estimated to be 1.4 micrograms per cubic meter or about 8% of the allowable PSD increment. The estimated annual mean at all points of maximum effect were estimated to be less than 50% of the federal primary and state standards of 75 and 60 micrograms per cubic meter, respectively.

The 24-hour total suspended particulate average at the point of maximum effect was projected to be 12.8 micrograms per cubic meter and the worst case property boundary concentration was 8.1 micrograms per cubic meter. The maximum point is well within the property boundaries and very close to the source cluster. Maximum increment consumption was estimated to about 35% of the allowable PSD increment of 37 micrograms per cubic meter. Projected 24-hour effect of all sources was added to the short-term background as a means of determining conformance with ambient standards. The results are displayed in Figure 2.4-1.

Annual average sulfur dioxide concentrations at both the point of maximum effect and at the worst property boundary location were projected to be less than 1 microgram per cubic meter. Property boundary values are below the PSD levels of significance of 1 and 5 micrograms per cubic meter, annual and 24-hour, respectively.

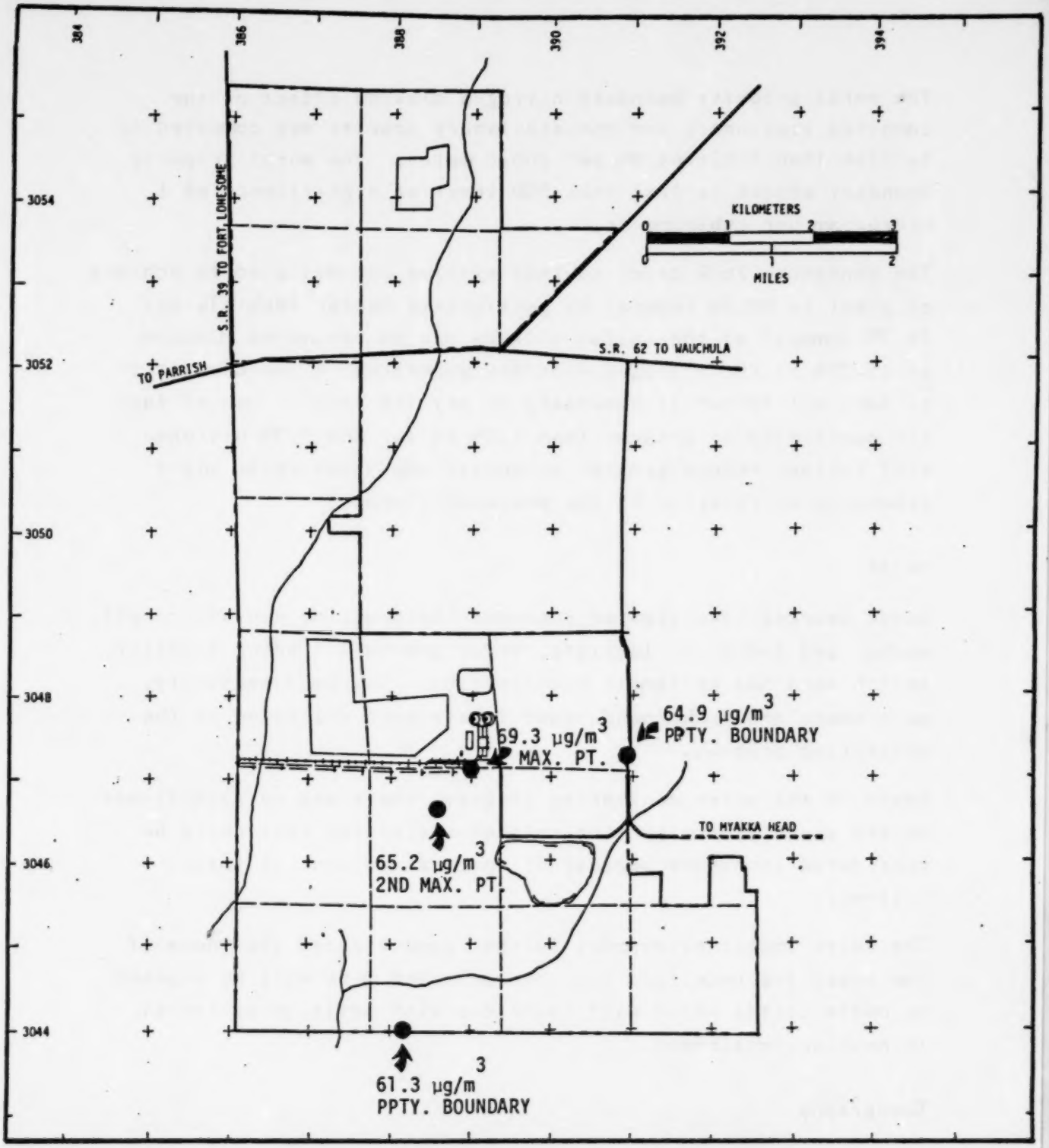

FIGURE 2.4-1

PROJECTED SHORT TERM (24 HOUR) EFFECTS OF ALL STATIONARY SOURCE PARTICULATE EMISSIONS

SOURCE CONSERVATION CONSULTANTS INC.

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PROPOSED DUETTE MINE
MANATEE COUNTY, FLORIDA

The worst property boundary nitrogen dioxide effect of the combined stationary and non-stationary sources was computed to be less than 1 microgram per cubic meter. The worst property boundary effect is less than PSD level of significance of 1 microgram per cubic meter.

The phosphate rock dryer control systems are designed to achieve as great as 99.8% removal of particulate matter (dusts), and 96.5% removal of the sulfur dioxide and an estimated minimum of 10-20% of the nitrogen dioxides generated in the combustion of fuel oil (which is necessary to dry the rock). Use of fuel oil containing no greater than 1.0% sulfur and 0.3% nitrogen will further reduce greater potential emissions which might otherwise be released by the proposed source.

Noise

Noise sources investigated included the dragline and sluice pit, washer and flotation facility, dryer and bulk loading facility, switch yard and reclamation activities. Source directivity, pure tones and background sound levels were evaluated in the monitoring program.

Based on the noise monitoring program, there are no significant noises associated with mine-related activities that could be considered intrusive because of spectral content of intermittency.

The noise impact assessment further demonstrated that none of the sensitive receptors near the proposed mine will be exposed to noise levels which will interfere with activity or result in hearing impairment.

Topography

Mining will significantly alter the site's topography on the short-term through surface strip mining and waste clay disposal activities. Short term effects are primarily the strip mine

land form of parallel spoil piles protruding from mine pits and dikes and dams used for waste containment/land reclamation.

Sand-clay landfill (5,426 acres) areas are expected to be near original elevation and have a very slightly rolling topography with a very low gradient largely toward the retained, natural watercourses or created lakes. Tailing landfill is largely planned for mined areas that correspond to the major, natural drainage divides to re-establish pre-mining watershed acreages.

Approximately 2,811 acres will not be mined or the existing topography disturbed in any fashion.

Soils

The proposed mining operation will disturb the existing soils on 7,583 acres or approximately three-fourths of the site. Strip mining will totally alter the nature of the existing soils on approximately 6,624 acres.

Waste disposal and physical reclamation techniques will result in the following three new types of surface soils on the site.

Soil Type	Acreage
Clay	480
Sand-clay	5,426
Overburden (over sand tailings fill)	848
Total	6,754*

*The remaining 829 acres consist of disturbed native soils and land and lake areas, the land portions of which will be composed of overburden material.

The short-term loss of soils from agricultural use, the initial absence of organic matter, i.e., humus in all reclaimed soils, and the decreased bearing capacity of clay and sand-clay soils relative to the natural soils must be regarded as unavoidable adverse impacts of the proposed operation.

Geology

In mineable areas, the upper geologic formation will be excavated to an average depth of 50 feet and a maximum depth of 100 feet.

During strip mining the overburden section of sands, clays and hardpan will be displaced to spoil windrows within the mining pit, and the underlying phosphatic ore will be completely removed down to the "bedrock" layer. These excavated areas will subsequently be either backfilled with sand and clay process wastes or left as water-filled areas. Formations below the mining section will remain undisturbed.

Groundwater Hydrology

Shallow groundwater at the proposed mine site is contained in the upper, or surficial materials and is found under both water table and artesian conditions.

The hydrologic properties of the surficial aquifer have been determined by pump testing and slug (or sensitivity) testing. The similarity of water levels in wells screened above or below the hardpan layer indicates the hardpan does not act as a significant confining layer. Permeability of the matrix has been shown to be low in comparison to the overlying sands.

The deep groundwater system at the proposed project site consists of the limestones and dolomites underlying the surficial or water-table aquifer and the phosphate matrix. This system includes the productive portions of the Hawthorn Formation and the Tampa, Suwannee, Ocala, Avon Park and Lake City Formations and is commonly referred to as the Floridan Aquifer. The producing zones for potable supply are found, in order of increasing supply potential, in the Hawthorn/Tampa, Suwannee and Avon Park Formations. The Lake City, Ocala and portions of the Hawthorn/Tampa Formations act as semi-confining units retarding the vertical movements of water in the deep groundwater system. Figure 2.4-2 indicates the groundwater systems underlying the property.

Water-level elevations in the Floridan Aquifer at the proposed project site range from 30 to 40 feet above mean sea level at some times of the year to near mean sea level at other times.

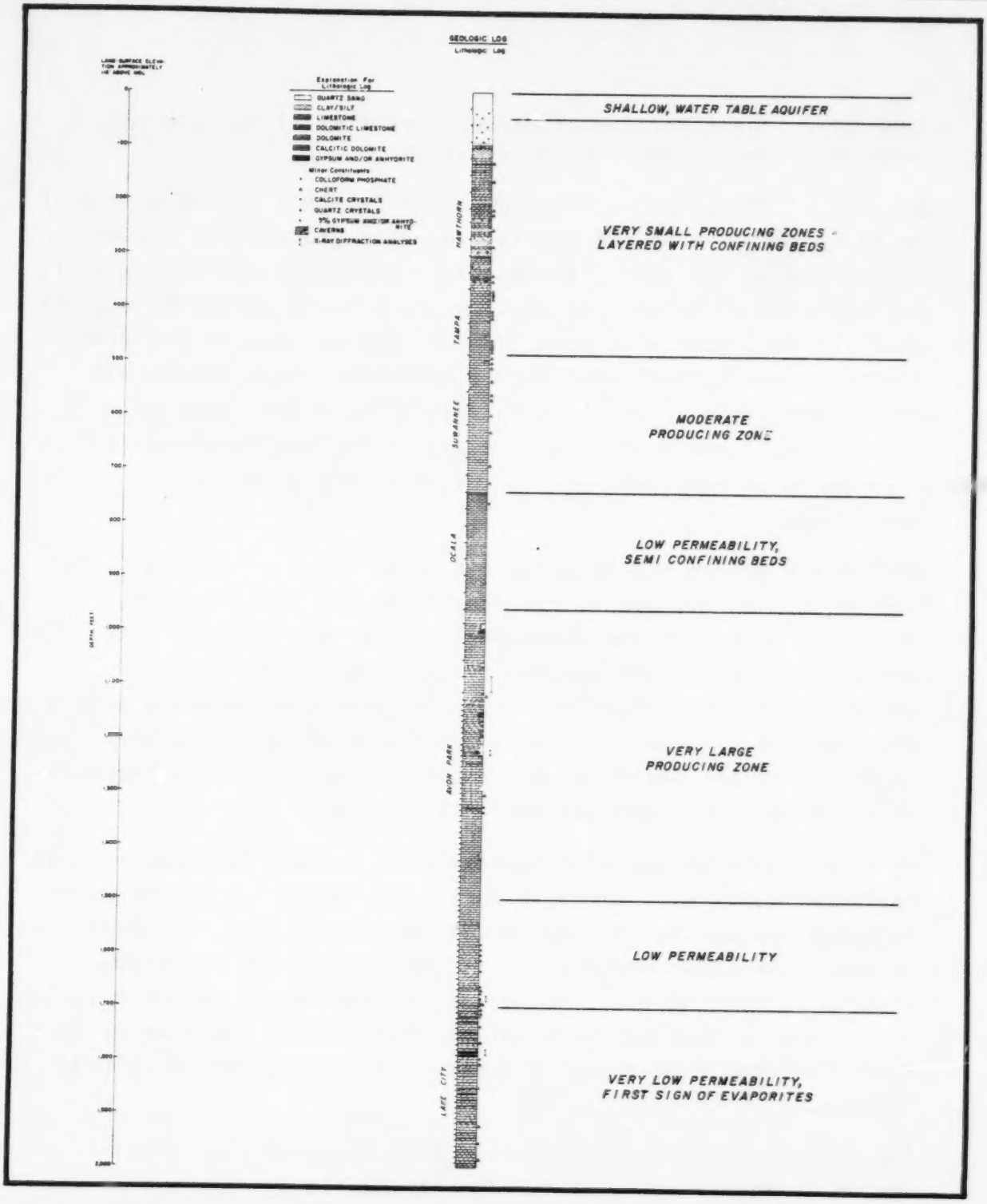

FIGURE: 2.4-2

SUBSURFACE GEOLOGY AND GROUND-WATER SYSTEMS

SOURCE: WILLIAM F. GUYTON & ASSOC.

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PROPOSED DUETTE MINE
MANATEE COUNTY, FLORIDA

Generally, the direction of groundwater flow at the project area is westerly, towards the coastline.

Effects of the proposed development of Estech's Duette Mine will be evidenced in both the shallow and deep groundwater systems. Dewatering of the surficial materials to facilitate mining will, to some extent, impact the shallow groundwater system throughout most of the property at some time during the life of the mine. As the active mining moves from a mined-out area, dewatering operations, other than those associated with the recharge project, will cease and water levels in the surficial aquifer will begin to re-establish themselves to the previous conditions.

Within the active mining area, the water level in the surficial system will be lowered to the top of the ore matrix. The projected effect of the mine operation on the regional flow pattern in the shallow groundwater system will be small in comparison to the effect on-site. On-site flow patterns within the surficial aquifer will be altered depending on the specific locations of the recharge and dewatering wells and the location of the clay, clay-sand and sand filled areas.

Vertical recharge (natural leakage plus induced recharge through recharge wells) will increase during the operation of the mine-recharge project but is expected to return to baseline conditions at some time after reclamation is complete if the recharge program is terminated. The reason for the return to the baseline conditions is that the vertical permeability of the underlying Hawthorn/Tampa Formations is the controlling factor of natural leakage.

The primary effect of withdrawals from the deep ground-water system is the lowering of the potentiometric surface within the area of influence of the wells.

Prior to the initiation of withdrawals, the SWFWMD Consumptive Use Permit requires the construction of sufficient recharge wells to transmit 3 mgd of water from the surficial aquifer into the

deep system. The effect of the recharge project will be to offset the withdrawals from the deep groundwater system by 3 mgd thereby decreasing the net impact on the Floridan Aquifer.

The effect of the scheduled net withdrawals is at a maximum at the end of the first three years of operation of the proposed mine. The decline of the potentiometric surface on the mine property will decrease when surface water becomes available beginning in the fourth year and net withdrawals decrease by 3 mgd.

The effect of the proposed withdrawals on the potentiometric surface is extremely small in comparison to the large seasonal fluctuation. The effect of the scheduled withdrawals from the deep groundwater system on the regional potentiometric surface is small.

Mitigating measures on the effects resulting from the proposed mining operations are primarily included in the terms and conditions of the SWFWMD Consumptive Use Permit (No. 27703739).

Groundwater Quality

The chemical analyses of water samples from the surficial aquifer throughout the region generally show the water to be soft, low in chloride content except in areas of brackish or saline waters, and often with relatively high iron concentrations.

In order of increasing depth, the Hawthorn/Tampa, Suwannee, Ocala, Avon Park and Lake City Formations comprise the deep groundwater system at the project site. With the exception of the Lake City, these formations, which make up the Floridan Aquifer, are typically relatively hard, clear, occasionally odorous, with low chloride concentrations except in areas of saline groundwaters near the coast.

Effects will be noticed in the shallow groundwater system in response to the recharge and reclamation projects. Effects due

to mining operations and dewatering are expected to be small in comparison.

The use of the mined-out pits as storage areas for the waste clays and tailing sands will have an effect on the water quality in the shallow system. The nature of the water quality changes will depend on the nature of the material placed in the pits.

The deep groundwater system will be affected primarily by the recharge project. Any effects on this due to withdrawals and the subsequent water-level changes are anticipated to be negligible.

The potential effects due to the withdrawal of water from the deep groundwater system include the upconing of highly-mineralized water found below the producing zones and the lateral movement of salt water inland from the coast. It is extremely unlikely that either of these potential impacts will occur at the Estech site.

Surface Water Hydrology

The 10,394 acre Estech site lies within portions of the watersheds of the Manatee River, the Little Manatee River and the Myakka River. A comparison of the three watersheds which lie within the site boundaries is presented in Table 2.4-B below.

Table 2.4-B Drainage Basin Areas

Watershed Name	Total Area of Watershed (sq. mi.)	Area of Watershed Within Mining Site (sq. mi.)	% of Watershed Within Mining Site (percent)	Area of Watershed Upstream of Mine Site (sq. mi.)
Little Manatee River	211	2.2	1.0	3.7
Lake Manatee	123	13.6	11.1	20.2
Myakka River	550	<1	0.1	0

United States Geological Survey (SGS) stream flow records on the Manatee River, two miles downstream from the confluence of the North and East Forks, were analyzed to obtain average maximum, average mean and average minimum monthly flows for the period of record from April 1966, through September 1974. Variations in flow were registered for the North Fork of the Manatee River and the South Fork of the Little Manatee River.

During peak stream flow periods a variable portion of the discharge of the East Fork Manatee River will be diverted through an off-channel weir to the surface water reservoir. This water which will be used to make up 2.88 mgd of the process demands, amounts to 25% of the average annual runoff of 11.8 mgd which comes from the total Duette Mine property. The diversion will not affect low or average flows since it will only occur during periods of high flow.

A general reduction in runoff from the Estech property will occur during the mining phase due to: 1) the increased area of water retention bodies on the property; 2) deep well recharge by connector wells; 3) dewatering of mine pits; and 4) the diversion to the surface water reservoir. As a result of these reductions, the combined average flow of the North Fork Manatee River and the East Fork Manatee River will be reduced.

The majority of the water which enters the streams on the Estech property as base flow comes from groundwater stored in the surficial aquifer within an approximately 200 foot wide zone adjacent to the streams. Since mining is not planned within this zone, except for a three-quarter mile segment of the East Fork Manatee River which will be rechanneled prior to its being mined, mining will have minimal effect on base flow. It is estimated that the reduction in base flow resulting from mining will decrease the average flow of the East and North Forks Manatee River where they exit the property by 1.0% and 1.5%, respectively.

Surface Water Quality

Fairly extensive wetlands border the streams traversing the proposed site, however, land uses at the mine site are primarily agricultural. Pollutant loadings of streams in the area arise almost exclusively from non-point, agricultural sources. There are presently no industrial or municipal point sources of water pollutants upstream or in the immediate vicinity of the proposed mine site.

Because the great majority of proposed mine site lies within the Manatee River drainage basin, the water quality investigation (and others preceeding it) focused major attention on the North and East Forks of the Manatee River which converge and flow into Lake Manatee.

Occasionally large and/or frequent variations with State and Federal water quality standards were observed in measured concentrations of numerous physical, chemical and bacteriological parameters in both the upper Manatee and South Fork Little Manatee River basins. For the most part, these variations appear to reflect natural conditions in these waters. Furthermore, the quality of the water has permitted the development and maintenance of moderately dense and diverse faunal communities in the streams.

Constituents of the plant discharge which might potentially degrade the quality of the streams leaving the site were determined through a preliminary screening process.

Of the forty-seven parameters investigated for which standards exist, fluoride and total dissolved solids (and the related parameter, specific conductance) are the only parameters whose concentration in the effluent may be expected to exceed ambient water quality standards within the limits of detectability of standard analytical techniques. These parameters, therefore, merited further investigation.

In addition to fluoride and TDS, the parameters, total phosphorus, total nitrogen, Biochemical Oxygen Demand (BOD),

and total suspended solids (TSS) were selected for further evaluation because of their potential effects on downstream water supplies. The effects of each of the six parameters was evaluated by estimating mass loadings (lbs/day) and concentrations (mg/l) in both the North Fork and East Fork after complete mixing.

Hypothetical Failure of Clay Settling Area Embankment

Evaluation of a hypothetical failure of the clay settling area embankment on the water quantity, quality and biology of the receiving waters and adjacent wetlands was summarized beginning with a description of the event and a brief discussion of its probability of occurrence.

The impact analysis was predicted on a ground-level break in the settling area embankment at the end of the third year of mining. At that time, the 480-acre settling area will be filled to capacity with approximately 23 feet of waste clays covered with 2 feet of clarified water. Two points of failure were considered separately.

Evaluation of the impact of the hypothetical settling pond failure on stream and reservoir water quality was subdivided into six areas or phases of potential impacts: (1) effects on stream water quality, (2) short-term effects on the Lake Manatee Reservoir, (3) intermediate-term effects on the reservoir, (4) long-term effect, (5) impact on the Manatee County water plant and (6) expected radium-226 levels in the raw and finished water supplies.

Radiological Environment

Baseline conditions of the radiological environment were evaluated for subsurface and matrix radioactivity, gamma radiation over unaltered lands, airborne radioactivity and radioactivity of surface water and ground water.

It is important to re-emphasize that any existing radium-226 in ground waters, especially in the Floridan Aquifer, may have a variety of sources and the most likely source is the naturally occurring radium-226 in the lower Hawthorn. This fact also makes it exceedingly difficult to "trace" radium-226 to its source, since nearly all materials and strata contain measurable quantities.

The radiological impact of the proposed Duette Mine, its beneficiation process and other activities are as follows:

Matrix Radioactivity - Radium-226 (9 pCi/g) in the matrix, some forty feet below the surface, will be mined and partitioned into waste clays (4 pCi/g), sand tailings (1 pCi/g), product pebble (29 pCi/g) and product concentration (24 pCi/g).

Subsurface Radioactivity - Pre-mining radium-226 profiles (<1 pCi/g at the surface to 18 pCi/g near the matrix) will be altered to a reclaimed profile having from between 1 and 4 pCi/g nearly uniformly distributed with depth.

Occupational Exposures - The highest potential for occupational exposure would be in loading tunnels unless they are ventilated and occupancy times restricted.

Terrestrial Gamma Radiation - The mean outdoor gamma radiation of the site is expected to increase from 5.1 μR/hr to 8.8 μR/hr.

Airborne Radioactivity - Dryer and other airborne emissions are expected to deposit over half of the radioactivity within a radius of 7.5 miles. The yearly deposition (pCi/m^2 per year) beyond one mile would not increase the radioactivity of the soil to any measurable degree.

Lung dose calculations indicate the highest dose rate for continuous exposure to be 6 mrem/yr at 500 meters west of the stack. All lung dose rates for continuous exposure beyond 1.5 miles are less than 1 mrem/yr.

Radon flux from the soil surfaces of the site are expected to increase from a basline of 0.2 pCi/m^2s to less than 0.8 pCi/m^2s.

Elevation of outdoor airborne radon-226 is not expected to be measurable.

Land Use Criteria - Residential development for the site is not expected within the immediate future. For any homes that are constructed, the predicted indoor radon progeny (WL) could range from .005 WL (tailings reclaimed) to 0.023 WL (clay settling areas).

Agricultural development of the site is not predicted to pose any radiological impact from the limited soil-to-crop-to-man food chain uptake.

Surface Water Radioactivity - Surface water radium-226 concentrations in off-site environs may be elevated from natural levels of 0.8 pCi/l to 2 pCi/l. By comparison, the drinking water standard for radium-226 is 5 pCi/l and the discharge guidelinesfor the industry is 9 pCi/l.

Groundwater Radioactivity - The groundwater radium-226 concentrations at the site are less than those observed in some non-mining regions. Radium-226 in ground waters appears to be associated with local subsurface environments.

The connector wells for recharge of the Floridan Aquifer represent a potential transport mechanism for radioactivity. However, monitoring of the more basic water quality parameters should prevent contamination by radioactivity.

Biology and Ecology

The biological and ecological baseline characteristics of the property are presented under three major headings based on vegetation associations:

- Land - description of terrestrial plant and animal communities
- Land/Water Interface - description of plant and animal communities inhabiting swamps and marshes
- Water - description of aquatic plant and animal communities

The existing land communities are sand pine scrub, longleaf pine-xeric oak, xeric oak and longleaf pine flatwoods.

The existing land-water interface communities are freshwater swamp, freshwater marsh and cypress.

The property contains three stream segments: East Fork Manatee River, North Fork Manatee River and the Little Manatee River. The direct effect of mining will be the physical destruction of much of the present natural vegetation by land clearing/mining activity. The longleaf pine-xeric oak community will be eliminated on-site while the sand pine scrub community, longleaf

pine-xeric oak community and longleaf pine flatwoods community will be partially eliminated (Table 2.4-C). An overall 85% loss of native upland vegetation represents the magnitude of mining effects.

Table 2.4-C Acreages Before Mining and After Reclamation (1)

Community	Present Acreages	Acreages After Reclamation
Sand Pine Scrub (2)	73	50
Longleaf Pine-Xeric Oak	35	0
Xeric Oak (2)	518	89
Longleaf Pine Flatwoods (2)	5,673	829
Fresh Water Swamp (3)	1,219	1,228
Fresh Water Marsh (4)	600	864
Cypress Swamp (2)	18	18
Improved Pasture	1,677	6,642
Row Crops	468	107
Orange Groves	113	25
Mixed Forest	0	58
Lakes	0	384
Abandoned Mining Operations	0	100
	10,394	10,394

(1) Data from Swift Agricultural Chemical Corp. (1978: DRI/ADA No. 770861 and Addendum)

(2) Acreages after reclamation represent unmined lands that still contain the vegetation present before the commencement of mining operations.

(3) 476 acres of natural vegetation lost, mostly from along tributary creeks and bayheads, also from along 4,000 feet of the East Fork Manatee River which will be mined. (Note: Revised in FEIS.) Fifty-five acres will be recreated by planting saplings of native species at a density of 60 saplings per acre along the recreated East Fork Manatee River.

(4) 364 acres of natural vegetation will be lost from mining. Some additional acreages will be disturbed or lost from construction of roads, railroads, pipelines, powerlines and from the crossings of draglines.

Not all sites containing native upland communities will be mined. The remnants of upland vegetation will primarily be small and isolated between swamps and/or improved pastures.

During mining, the groundwater table will be lowered beneath nearby natural communities which are not scheduled for mining.

The water tables will be restored in less than two years as the mined-out pits are filled during reclamation. Water tables are expected to closely approximate their pre-mining levels thereafter. The magnitude of dewatering would be equivalent to that of severe drought.

The regrowth of fresh water swamps will be slow. Several decades of tree growth are necessary before a mature forest develops. Sweetbay, swamp bay and other species that are more common in bayheads will likely remain relatively uncommon until peaty acid substrates gradually develop along the minor tributaries.

Fresh water marsh reclamation should be more rapid. Emergent and shallowly submerged aquatics readily invade borrow pits, clay settling ponds and other newly created wet habitats in the region.

The effect of mining on marshes will be short-term with regard to the rapidity of marsh re-establishment on reclaimed lands. The probability of cattails predominating in much of the reclaimed marshland may constitute a long-term adverse impact of low magnitude with regard to species diversity and wildlife utilization. This impact would not be adverse with regard to water quality and flow.

Various mining activities will result in the destruction, alteration and/or restoration of aquatic habitats as well as the creation of new habitats. Among the new habitats will be several large lakes, a type of habitat not presently existing in the vicinity of the mine site.

Little disruption of the flow in the streams is expected due to mine pit dewatering (Ardaman & Associates, Inc., 1975), hence there will be little impact on the aquatic biota.

Phosphate mining will create several lakes on the Estech site. This is a significant expansion of the aquatic environment and can be considered a positive impact of mining.

The mining and reclamation plan incorporates several structural and non-structural measures intended as safeguards for the environment and biota of the site.

Sixteen endangered, threatened, rare or special concern species have been observed on or immediately adjacent to the Estech property. Of the sixteen observed species listed, none were considered as endangered on the federal lists, but three were listed as threatened. They were: pinweed, eastern indigo snake and American alligator.

Bald eagles, ospreys and caracaras might make occasional visits to the Estech property, but the present complex of habitats would not be particularly attractive to these species.

This section assigned environmental sensitivity values to the various attributes of each community/habitat. An area is considered sensitive if it meets one or more of the following criteria:

- Contains endangered or threatened species which cannot survive elsewhere.
- Fulfills an important function, such as aquifer recharge or high wildlife capacity.
- Represents a unique or rare community or habitat in west-central Florida.

Twelve attributes were evaluated on a scale of 1 to 5. Other potential attributes were omitted because they do not represent land uses (e.g., camping, hiking) or natural processes currently associated with the Estech property. The assignments of some values were necessarily subjective for lack of sufficient observations or data.

2.5 DESCRIPTION OF BASELINE, IMPACTS, AND MITIGATING MEASURES OF THE MANMADE ENVIRONMENT

Demography

Population characteristics and projected growth for the seven-county region should not be impacted by the planned Duette mining

operation. It is an extension of general mining activities within the industry and is a replacement for an existing Estech facility.

The local situation is similar to the brief Regional analysis. Needed mine workers should be easily obtained from the local labor supply. Support workers serving the mine operation may reside in Manatee but in small numbers.

Economics

The following figures are the projected primary direct tax revenues to state and local government during mining operations:

	Annual Yield
Sales Tax (State)	
operating supplies and materials value - $9,561,000 x 4% =	$ 382,400
Severance Tax (State)	
Value to be set by Dept. of Revenue est. value - $16.00/short ton, tax rate (1980) 8% 25% of revenues - returned to mine for reclamation 25% of revenues - to Fla. Phosphate Research Institute 50% of revenues - to State general revenues production 3,000,000 T.P.Y. x $16.00 = $48,000,000 x 8% = $3,840,000 - 50% =	$1,920,000
Ad Valorem Tax (County)	
value of real estate and plant $120,947,400 x 16.388 mills =	$1,982,000

Land Use

Land use for the proposed site is proposed to be agricultural use in the Manatee County Comprehensive Plan. This use is consistent with the planned mining operation because of the proposed land reclamation program.

The proposed action will not significantly affect the future growth patterns within the built-up coastal areas of Manatee

County. The anticipated growth in residential land use will year life of the mine operation. The commercial and institutional land uses generally associated with residential development will also develop where they are presently concentrated.

Community Services and Facilities

The Duette Mine is not expected to have a significant effect upon potable water supplies within the County. Fire protection and law enforcement facilities largely serve the built-up area and there is no reason to anticipate any increased service as a result of the proposed mine. Fire protection and emergency medical services will be provided on the mine site. Domestic waste generated by the mine will be treated on-site.

Sensitive Manmade Areas

No facilities, urban development or other significant manmade features will be displayed by the site. Several long-abandoned homesites will by removed by the mining operation. The only significant prehistoric site which meets National Register criteria is recommended for protection.

Transportation

The initial increase in vehicular traffic due to the proposed mining operation will be due to the construction of the plant site, whereas later increases in traffic will be due to the daily operation of the mine itself. Traffic generation from the Beker and Grace proposed mines was considered in this analysis.

The proposed mining operation will generate one hundred, 80-ton rail cars per day. Presently, the Port of Tampa has the only major bulk loading facilities capable of handling the anticipated production from the proposed mine. Should Port Manatee construct a major bulk loading facility, the Duette Mine project would create a very significant beneficial impact on those facilities and the Port area in general.

Archaeological and Historical Properties

Two field surveys of the Duette Mine tract were undertaken to locate historic and prehistoric cultural resources on the property, to evaluate the significance of the resources, to determine impact on the resources and to recommend mitigative measures.

A total of five prehistoric sites were located on the property during the course of the two field surveys. One prehistoric site, the Carruthers Mound, is deemed to meet the significance criteria on the ground that it may contain data of regional archaeological importance.

Such sites, few in number, are important cultural resources. The Carruthers Mound is in an area which is not scheduled for mining and hence will not be destroyed in that operation.

Resource Use

Electricity, gasoline and diesel fuel will be the energy sources used during the construction phase of the project. Once in operation, the mine and plant will operate on electric power supplied by Florida Power & Light Company.

Fuel oil will be used to provide thermal energy for the product dryers, and gasoline and diesel fuel will be used for motor vehicles.

At the planned rate of 3.0 million short tons of product per year, Estech will deplete the deposits presently identified recoverable reserves in the projected 21 year mine life. The 60 million short tons of the economic reserves represent 4.3% of the identified Florida resources.

2.6 COMPARISON OF PROPOSED ACTIVITY WITH AREAWIDE EIS RECOMMENDATIONS

The Final Areawide Environmental Impact Statement for the Central Florida Phosphate Industry published by the Environmental

Protection Agency in November 1978 (Areawide EIS) evaluated the impact of various alternative scenarios of phosphate mining in central Florida. The EPA recommendations represent a scenario of phosphate development which was determined to be as compatible as practicable with other desired and intended land uses. This scenario provides a decision making tool for all new source phosphate mines in central Florida.

The Areawide EIS recommended the elimination of rock-drying processing at beneficiation plants and transportation of wet rock to chemical plants. This recommendation was accompanied by a description of conditions whereby the recommendation may not be applicable.

Since the Areawide EIS study was undertaken, important study assumptions relative to air quality were mitigated by a significant action of the U. S. Congress. The Clean Air Act Amendments of 1977, required the application of Best Available Control Technology (BACT) to all significant sources and source modifications which had potential to deteriorate air quality. The recommendation to eliminate rock drying in the Areawide EIS was based upon greater allowable source emission rates than are now permitted by U. S. EPA Prevention of Significant Deterioration (PSD) Regulations promulgated under the 1977 Amendments. For example, study assumptions for particulate matter were limited by allowable emission rates as provided for in the Florida Administrative Code (F.A.C. 17-2.05,2, Process Weight Table). This rule permitted particulate emissions at least twice as great as allowed under the PSD Regulations. A conclusion of the Areawide EIS proposed action was that the phosphate industry pollutant contribution would remain relatively constant after 1977. However, the PSD Regulations suggest that the contribution should decrease as new processing facilities are constructed and older less efficient control sytems are replaced with new technology.

By establishing maximum increments of allowable deterioration, the PSD regulations effectively restrict availability of the

air resource. Once the available resource is consumed by competing interest, no additional significant source effect can be permitted without a corresponding reduction in effect from another source. Thus the objective of the Areawide EIS to protect air quality will be attained by an enforceable and pervasive system of air quality control.

Estech proposes to construct a rock drying facility at the Duette Mine site. Two fluidized bed dryers are planned for drying 252 tons per hour each (dry basis) of phosphate rock from 13% to 2% moisture. The proposed drying facility is subject to PSD Regulations. These regulations require preconstruction monitoring of pollutant levels, application of Best Applicable Control Technology (BACT), and control of emissions to insure that PSD concentration increments are not exceeded. The rock dryers proposed for the Estech facility will utilize Venturi-absorbers and wet centripetal vortex contact scrubbers. The application of this technology will reduce emissions or particulate matter and sulfur dioxide to levels well below state and federal standards. The application of BACT will also minimize the pollutant concentration levels of airborne radiation.

The Areawide EIS recommended that all New Source mines meet State of Florida and local effluent limitations for any discharges.

Pursuant to Section 401 of the Federal Water Pollution Control Act as amended (33 USC 1251, 1341), the State of Florida is required to issue certification for each National Pollutant Discharge Elimination System permit. All recent NPDES permits issued by the State for phosphate mining facilities have been certified subject to the following conditions:

1. The applicant must comply with all applicable requirements of Chapter 403, Florida Statues and Chapter 17 series, Florida Administrative Code.

2. Issuance of certification does not constitute State certification of any future land alteration activities which require other Federal permits pursuant to Section 404 of P. L. 92-500, as amended, nor does it constitute approval or disapproval of any future land alteration activities conducted in waters of the State which require separate Department permit(s) pursuant to Section 17-4.28, FAC.

3. In accordance with Section 17-6.01(2)(a)2a.D., FAC, the following effluent limitations apply to all discharges designated as possibly containing contaminated runoff, process generated wastewater or mine dewatering discharges from the mining and beneficiation of phosphate rock:

Characteristic		Discharge Limitations		Monitoring Requirements
		1-Day Max.	30-Day Avg.	
TSS	mg/l	25	12	1/week/24-hr. composite
Total P	mg/l	5	3	1/week/24-hr. composite
pH		6.0-9.0	6.0-9.0	1/week grab

This certification must indicate that the terms and conditions of the NPDES permit will result in compliance with Sections 301, 302 and 303 of the Federal Water Pollution Control Act as amended. The State may impose as additional requirements applicable state law or regulations related to water quality standards.

The elimination of conventional aboveground slime-disposal areas was recommended by the Areawide EIS. In order to meet this recommendation, the Areawide EIS encouraged the use of waste clays, or a mixture of sand tailings and waste clays, in reclamation, while at the same time it recognized the need for an initial aboveground storage area and for retaining dikes around sand-clay mix areas.

Estech's proposal conforms to this recommendation. Estech has committed in their mine plan to use a sand-clay mix in land reclamation and thereby reduce the need for traditional, separate disposal areas. The initial clay settling area planned by Estech for the mining operation will receive all clay wastes generated before the sand-clay mix procedure becomes operational. The settling area will remain active throughout the mine life to receive clay wastes in excess of the sand-clay mix requirements and to serve as a secondary water clarification and storage area.

Upon completion of mining, drainage and drying will be induced to provide for subsidence and crust development of the clay settling area. Once the clay has subsided to the desired level,

the exterior retaining dike will be pushed toward and away from the settling area to establish a lower grade slope and provide some coarser textured material for the interior soils.

The Areawide EIS recommended that any New Source mine and beneficiation plant meet Southwest Florida Water Management District consumptive-use permit requirements. Estech is obligated to the terms and conditions of the SWFWMD Consumptive Use Permit. Should Estech fail to comply with all of the conditions set forth in the permit, then the permit shall automatically become null and void.

The Areawide EIS recommended that the New Source mine provide storage that allows recirculation of water recovered from slimes. The water recirculation system of the proposed mining and beneficiation facility provides 156.03 mgd, 3.73 mgd are lost to evaporation, 11.487 mgd by clay absorption, 2.28 mgd are lost to seepage within the recycle system, and 142.27 mgd are returned to the process system. Ninety-nine percent of the water recoverage from slimes by the recycle system is either returned to the plant process or lost to non-discharge phenomena. The remaining 1%, or 1.43 mgd, is discharged.

Another Areawide EIS recommendation was for the use of connector wells. As a condition of the SWFWMD Consumptive Use Permit, Estech has agreed to the installation and operation of connector wells to recharge the Floridan Aquifer with an estimated availability of 3 mgd. Monitoring of the quality of the water being discharged from the shallow aquifer is required by SWFWMD permit for various parameters and at a specified schedule. The water quality analysis will include the following constituents:

a) Total coliform count
b) Fecal coliform count
c) Gross alpha radiation (if greater than 15 pCi/l analyze for radium-226, total radium)
d) Iron
e) Fluoride
f) Phosphorus
g) Sulfate
h) Pesticides
i) Organic Carbon
j) Specific conductance
k) Nitrate
l) Phosphate (ortho, total)
m) Total dissolved solids
n) Total suspended solids
o) Turbidity

The permit further provides for the cessation of the introduction of the water from the upper system for cause.
Another recommendation of the Areawide EIS was that each New Source mine address proposed regulations regarding radiation levels and develop a reclamation plan that considers radiation of spoil material and the amount of radionuclide-bearing material left within 3-4 feet of the surface.

All post reclamation criteria for the radiological environment were estimated without returned topsoil. The mining plan, however, suggests that approximately 2 feet of topsoil may be returned to some of the reclaimed area. This procedure is recommended, since expected guidance for construction of residential homes may require near background levels. The final clay settling area when returned to any land use will be most beneficially affected by returned topsoil. The 3-4 feet of returned topsoil recommended in the Areawide EIS, however, may have a high cost-benefit ratio in this region of lower matrix radioactivity.

If the final guidance (EPA, 1979) for reclaimed lands suggests an upper limit of predicted radon progeny in slab-on-grade homes of 0.009 WL (normal background of 0.004 WL plus the uncertainty of 0.005 WL), then the Duette site may have to consider the return of topsoil to any residential development site.

The areawide EIS recommended meeting county and state reclmation requirements and including in the DRI and/or site-specific EIS an inventory of types of wildlife habitat in the area to be mined and the area immediately surrounding it. In addition, it recommended the mining and reclamation plan take into account the protection and restoration of habitat so selected important species of wildlife will be adequately protected during mining and reclamation.

Wildlife habitats with their associated fauna and flora are described in detail in the Biology and Ecology section of the DEIS and the attendant Resource Document. Restoration or

preservation of some wildlife habitats have been incorporated in the mining and reclamation plan. Not all areas of the property will be mined or irrevocably disturbed. Of the unique communities on site, fifty acres of sand pine scrub and the 18-acre cypress dome will be preserved. Approximately 829 acres of cut-over flatwoods excluded from mining will be restocked with pine to enhance wildlife value.

Following the EPA recommendation to preserve the section of the East Fork Manatee River scheduled for mining, all floodplain swamps of streams having greater than 5 CFS mean annual flow will be spared from mining and will be preserved without modification. The major stream corridors were found to be the most valuable wildlife habitat on-site.

The Areawide EIS recommended protection or restoration of wetlands "under the jurisdiction of the Corps, Section 404, Federal Water Pollution Control Act, pursuant to 404(b) Guidelines (40 CFR 230)".

No specific boundaries of wetland areas have been officially identified by the Corps of Engineers. Three categories of wetlands were, however, established in the Central Florida Phosphate EIS:

Category 1 - Wetlands to be protected (not mined)
Category 2 - Wetlands which may be mined but must be restored as wetlands capable of performing useful wetland functions
Category 3 - Wetlands which can be mined without restoration as wetlands

Definitions for the categories established in the Areawide EIS were developed in the Draft EIS. The definitions were presented as a suggested methodology for determining the limits of each category. These categories should be viewed as general guidelines to rank natural wetlands on Florida phosphate mining sites in terms of their value to regional hydrology, water quality and fish and wildlife protection. This categorization is intended to aide in the EPA review process of proposed Mining/Reclamation Plans for New Source Mines. The three categories

are defined in further detail for application to the review of Estech's Duette property.

The three categories of wetland on the Duette site were delinated. A segment of the East Fork Manatee River is a major Category 1 wetland proposed for mining. EPA recommends that this segment, as well as all other Category 1 wetlands, be preserved. (Note: Estech has modified their proposed activity to exclude the mining of the East Fork Manatee River, a Category 1 wetland.)

Any of the Category 2 wetlands which are proposed for mining may be mined and must be restored. The proposed reclamation plan will result in a net gain of 15% for swamp and marsh acreage on the site.

The Areawide EIS recommended that efforts be made to preserve archaeological or historical sites through avoidance or mitigation on sites deemed significant by the Florida Division of Archives, History, and Records Management. If mitigation is chosen, the resulting report should be submitted to that state agency for examination and comment.

One archaeological site of significance, the Carruther's Mound, was identified on the Estech property. The mound is in an area which is not scheduled for mining and hence will not be destroyed in that operation.

3.0 ERRATA

3.1 DRAFT ENVIRONMENTAL IMPACT STATEMENT

Page	Paragraph & Line		Correction
Summary Sheet (1)	2	7	Change "Imapct" to "Impact"
Summary Sheet (4)	3	5	Change "minig" to "mining"
Summary Sheet (5)	2	2	Delete "use"
Summary Sheet (6)	3	14	Change ".023" to ".015"
Summary Sheet (6)	4	6	Change "appears" to "appear"
7	3	14	Change "one-mile" to "3/4 mile"
31	5	7	Change "3.75" to "3.8"
31	5	7	Change "6.3" to "8.4"
33	4	6	Change "at" to "of"
42	1	2	Change "12.8" to "12.9"
43	Figure 4.2-5		Replace with revised Figure 4.2-5R
51	5	3	Change "drainged" to "drained"
52	4	19	Change "provideing" to "providing"
53	4	3	Change "rclaimed" to "reclaimed"
65	Figure 4.7-3 (a) (b)		Generalized change (dotted line) in potentiometric surface will be to the northeast instead of to the southwest as shown.
80	4	3	Change "2000" to "200"
82	3	4	Change punctuation at end of sentence from "1978." to "1978)."
82	5	3-4	Replace with "that do not conform to either EPA (1976) water quality criteria, phosphate mine effluent limitations or state standards for Class I-A waters are italicized."

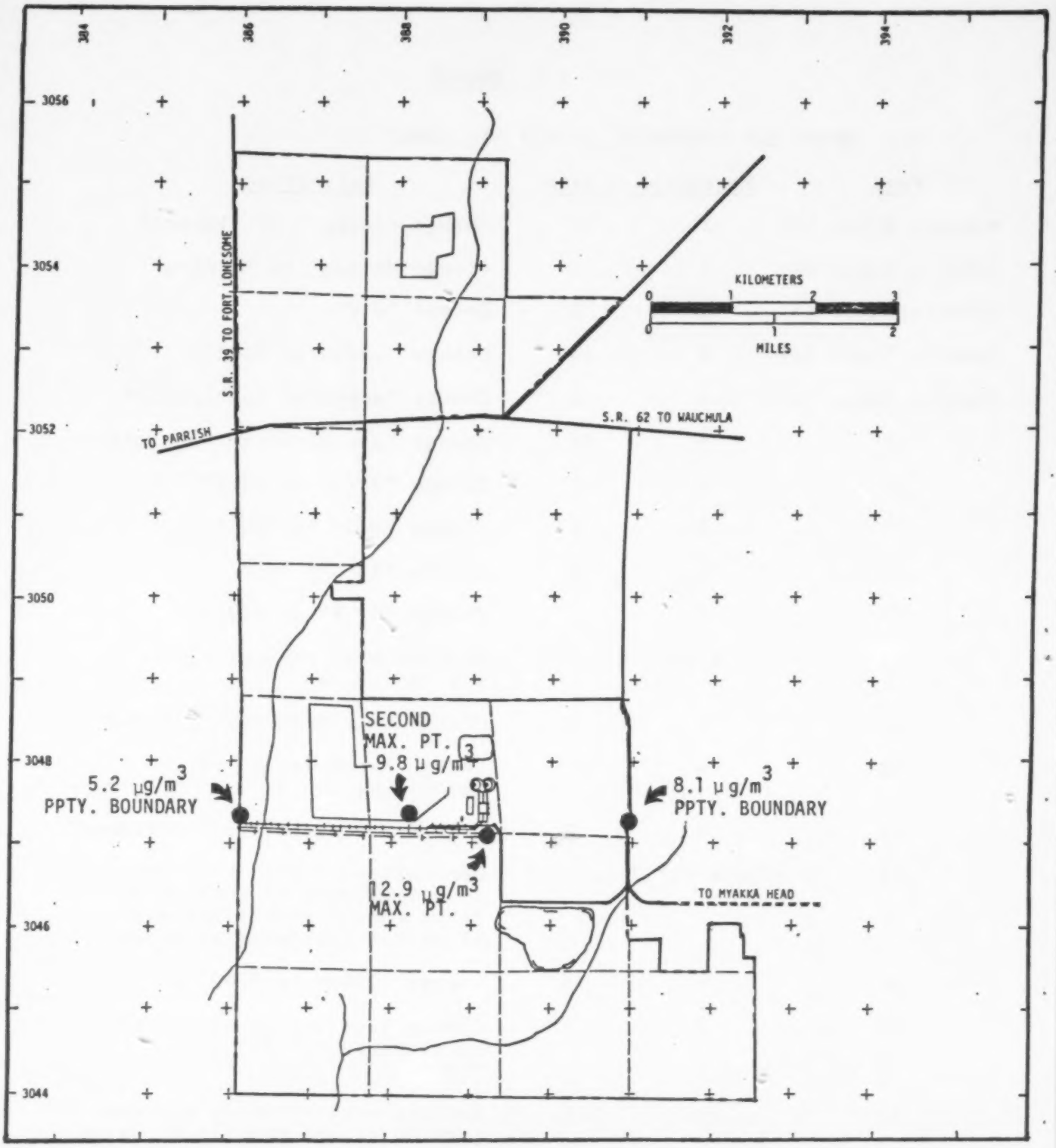


FIGURE 4·2-5R

SHORT TERM (24 HOUR) EFFECTS OF INCREMENT CONSUMING SOURCE PARTICULATE EMISSIONS

SOURCE CONSERVATION CONSULTANTS INC.

U.S. EPA - REGION IV
DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR SWIFT AGRICULTURAL CHEMICALS CORPORATION
PROPOSED DUETTE MINE
MANATEE COUNTY, FLORIDA

Page	Paragraph & Line	Correction
83	Table 4.10-A	Remove italics from all entries under pH except for the minimum values of 5.5 and 5.7 at Stations 2 and 7, respectively. Remove italics from all entries under Fluoride.
86	5 1	Delete "in the" and replace with "at". Also insert "stations" after "on-site"
90	Figure 4.10-2	Replace Figure 4.10-2 with revised Figure 4.10-2R
91-100	All	Pages 91-100 were duplicated in several copies during printing process. Not all copies were affected.
92	First Line	Change "5%" to "1.6%"
93	3 3	Replace sentence with "Loadings of total nitrogen, BOD and TDS were based on their expected daily average concentrations, whereas loadings and resultant concentrations of total phosphorus, fluoride and TSS were computed for both 30-day average and daily maximum contaminant levels."
93	5 5	Change "is" to "are"
98	6 2	Change "of" to "on"
100	First Line	Delete "and instantaneous"
100	1 3	Change "butr" to "but"
100	3 1-8	Replace paragraph with "The concentration of suspended solids at the intake structure to the water treatment plant was estimated using Stoke's Law (American Water Works Association, 1971) and a particle size distribution representative of waste clay from Central Florida mines (Lamont, et al., 1975). It was conservatively estimated that 42% of the suspended solids would be removed;

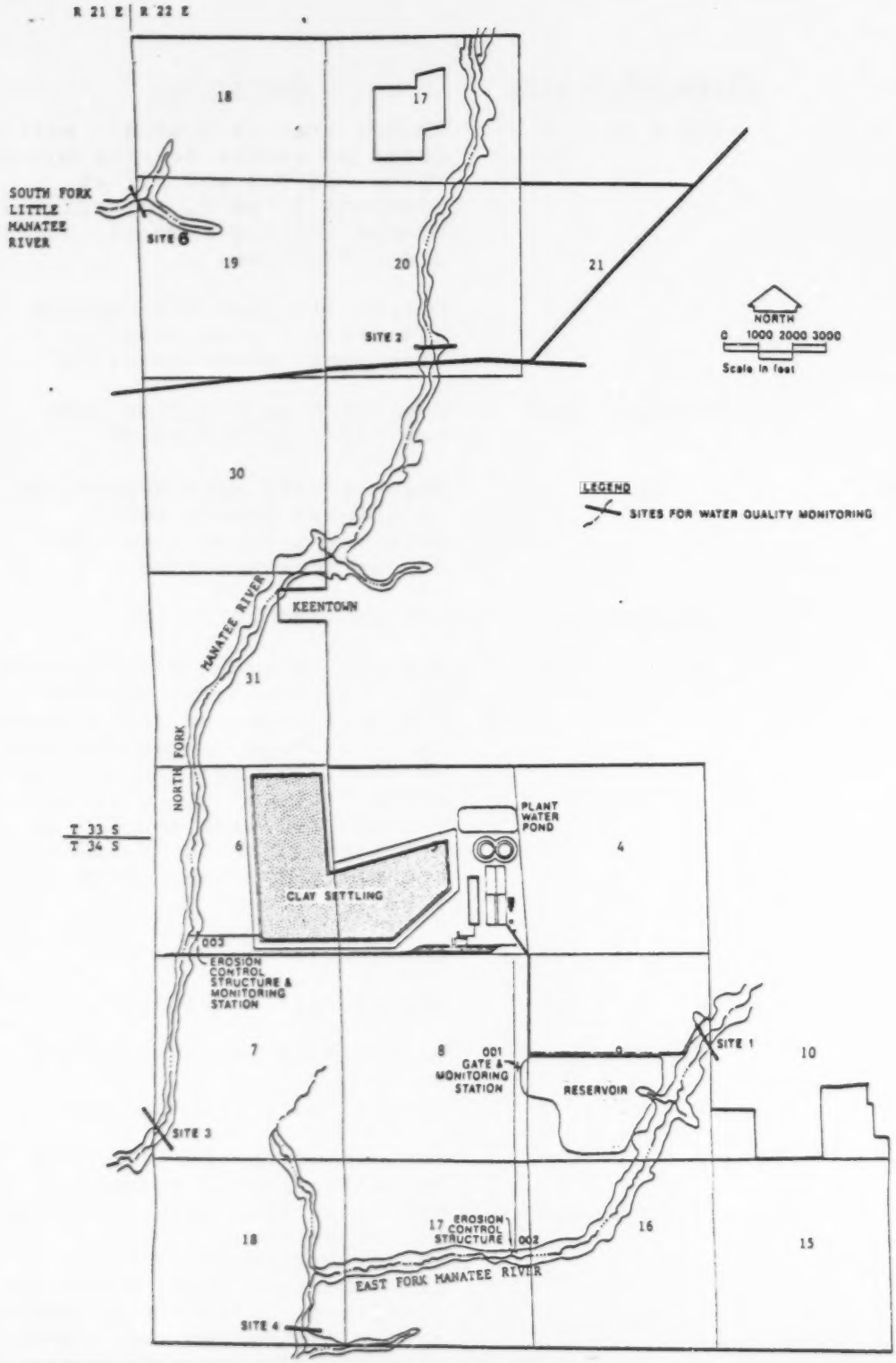


FIGURE : 4.10-2R

DISCHARGE POINTS AND WATER QUALITY MONITORING STATIONS

SOURCE : ZELLARS - WILLIAMS , INC.

U.S. EPA - REGION IV
DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR SWIFT AGRICULTURAL CHEMICALS CORPORATION
PROPOSED DUETTE MINE
MANATEE COUNTY , FLORIDA

Page	Paragraph & Line		Correction
100 (con't)	3	1-8	hence, a maximum of 425 mg/l could be expected to enter the lowermost water intake structure."
100	4	1-2	Delete
101	First Line		Delete remainder of paragraph beginning with "An increase in alum ....." Replace with "Results of jar tests conducted by the Manatee County Utilities Department (Conservation Consultants, Inc., 1980) indicated that approximately a 61% increase in the normal alum dosage would be necessary to effectively remove 425 mg/l of suspended solids. The sludge handling system of the facility would be potentially stressed by the increased mass of solids. To protect the sedimentation basin scraper assembly from possible damage, some increase in the frequency of basin blowdown would probably be necessary. The resulting increase in the volume of sludge would likely exceed the planned capacity of the drying bed and lagooning system. Proper disposal of the excess sludge would require either modifications to the existing facility or transporation of the wet sludge to another disposal site. If a satisfactory method for disposing of excess sludge were developed, no reduction in the water production capacity of the plant would be necessary."
101	1	1-8	Delete
101	2	13	Change "52" to "425"
101	2	15	Change "0.4 pCi/l" to "3.4 pCi/l"
101	2	20	Change "1.2 pCi/l" to "4.2 pCi/l"

Page	Paragraph & Line		Correction
103	1	2	Change "benefication" to "beneficiation"
111	4	2	Change "5.1 R/hr" to "5.1 μR/hr"
111	4	4	Change "6.3 R/hr" to "6.3 μR/hr"
111	5	5	Change "Uranium-238, Thorium-230, Radium-226" to "uranium-238, thorium-230, radium-226"
111	8	5	Change "Uranium and Radium-228" to "uranium and radium-228"
112	Figure 4.11-3		Change "concentration" to "concentrate"
113	4	6	Change "(x0.5 pCi/g)" to "(≃0.5 pCi/g)"
123	5	5	Change "diamond back" to "diamondback"
124	Third Line		Change "meadow lark" to "meadowlark"
124	Tenth Line		Change "betwen" to "between"
129	5	10	Change "indefinitely." to "indefinitely,"
136	5	7	Change "carracara" to "caracara"
181	NPDES draft permit		Pages 6 and 8 were omitted. Complete draft NPDES permit included in Section 8.1 of FEIS.
vii	Selected Bibliography		Add the following reference after the third entry; "Conservation Consultants, Inc., 1980. Personal communication between R. M. Eckenrod (CCI) and J. Zimmerman (Manatee County Utilities Department), May 14, 1980."
xi	Selected Bibliography		Add the following reference as the first entry; "Lamont, W. E., J. T. McLendon, L. W. Clements, Jr., and I. L. Feld. 1975. Characterization Studies

Page	Paragraph & Line	Correction
xi (con't)		of Florida Phosphate Slimes. U.S. Department of Interior, Bureau of Mines, Tuscaloosa Metallurgy Research Laboratory, University, Alabama."

3.2 ARCHAEOLOGICAL AND HISTORICAL PROPERTIES RESOURCE DOCUMENT

Page	Paragraph & Line	Correction
54	3 4	Change "wtihin" to "within"
Appendices	Site data sheets were duplicated	Delete last 36 pages

3.3 METEOROLOGICAL CONDITIONS RESOURCE DOCUMENT

Page	Paragraph & Line	Correction
6	Table 3-B	Delete last two columns
19	Table 6.1-A & Table 6.1-B	Conversion error appeared throughout Tables 6.1-A and 6.1-B. Replace with revised Tables 6.1-AR and 6.1-BR
22	1-3 All	Replace with "The Tampa wind distributions show evidence of land-sea interaction, i.e., morning easterly - afternoon westerly, particularly during the spring and summer months (NOAA, 1972). The fall/winter distributions for both Tampa and Lakeland suggest each experience much of the same effect from the passage of cold period frontal systems. The mean annual wind speed for Lakeland (1942-1945) was 6.8 knots (3.5 meters per second, 7.8 miles per hour). The highest seasonal mean wind speed was 8.0 knots (4.1 meters per second, 9.3 miles per hour) in the spring and the lowest was 5.5 knots (2.8 meters per second, 6.3 miles per hour) in the summer. A wind speed of 11.3 knots (5.8 meters per

TABLE 6.1-AR

SEASONAL WIND DISTRIBUTION FREQUENCY AND WIND SPEED FOR LAKELAND (1942-1945)

Direction	SPRING				SUMMER				FALL				WINTER				ANNUAL			
	Distribution Frequency %	Mean Wind Speed			Distribution Frequency %	Mean Wind Speed			Distribution Frequency %	Mean Wind Speed			Distribution Frequency %	Mean Wind Speed			Distribution Frequency %	Mean Wind Speed		
		MPH	Knots	m/Sec		MPH	Knots	m/Sec		MPH	Knots	m/Sec		MPH	Knots	m/Sec		MPH	Knots	m/Sec
N	4.1	7.8	6.8	3.5	3.2	5.7	4.9	2.6	10.2	6.6	5.7	3.0	8.6	7.8	6.8	3.5	6.9	7.1	6.2	3.2
NNE	5.6	9.0	7.8	4.0	2.3	6.1	5.3	2.7	8.5	8.0	6.9	3.6	7.0	8.8	7.6	3.9	6.1	8.3	7.2	3.7
NE	8.4	9.8	8.5	4.4	7.3	6.0	5.2	2.7	18.4	8.7	7.6	3.9	8.5	8.0	6.9	3.6	11.0	8.3	7.2	3.7
ENE	9.6	11.1	9.6	5.0	6.0	7.3	6.3	3.3	9.3	8.7	7.6	3.9	6.8	8.5	7.4	3.8	8.0	9.0	7.8	4.0
E	9.9	9.2	8.0	4.1	6.6	6.3	5.5	2.8	8.6	7.4	6.4	3.3	6.0	7.5	6.5	3.4	7.7	7.8	6.8	3.5
ESE	8.0	9.5	8.2	4.3	6.1	6.9	6.0	3.1	3.1	6.5	5.6	2.9	3.1	8.4	7.3	3.8	4.8	8.1	7.0	3.6
SE	8.9	9.0	7.8	4.0	10.7	5.7	4.9	2.6	4.2	6.0	5.2	2.7	4.4	6.9	6.0	3.1	6.7	7.0	6.1	3.1
SSE	6.3	10.5	9.1	4.7	5.7	6.4	5.6	2.9	1.7	6.6	6.9	3.0	4.3	9.4	8.2	4.2	4.3	8.6	7.5	3.8
S	5.1	10.2	8.9	4.6	6.3	6.0	5.2	2.7	2.8	6.1	5.3	2.7	5.5	8.9	7.7	4.0	4.8	7.9	6.9	3.5
SSW	4.5	11.4	9.9	5.1	6.4	6.4	5.6	2.9	1.8	6.8	5.9	3.0	4.4	10.8	9.4	4.8	4.1	9.0	7.8	4.0
SW	5.5	11.4	9.9	5.1	7.4	7.0	6.1	3.1	2.9	6.3	5.5	2.8	5.3	9.5	8.2	4.3	5.1	8.7	7.6	3.9
WSW	3.2	11.6	10.1	5.2	2.8	7.6	6.6	3.4	1.7	7.2	6.3	3.2	2.9	9.5	8.2	4.3	2.6	9.2	8.0	4.1
W	4.0	9.4	8.2	4.2	4.1	8.1	7.0	3.6	2.7	7.2	6.3	3.2	4.6	8.9	7.7	4.0	3.8	8.5	7.4	3.8
WNW	3.5	9.7	8.4	4.3	3.3	8.5	7.4	3.8	3.1	9.1	7.9	4.1	6.9	10.3	8.9	4.6	4.3	9.6	8.3	4.3
NW	3.9	9.8	8.5	4.4	4.2	7.2	6.3	3.2	6.3	7.7	6.7	3.4	8.2	8.5	7.4	3.8	5.5	8.3	7.2	3.7
NNW	3.0	8.0	6.9	3.6	2.1	6.7	5.8	3.0	5.2	6.0	5.2	2.7	5.9	7.9	6.5	3.4	4.3	7.0	6.1	3.1
CALM	6.4				15.4				9.6				7.7				9.6			
Mean Wind Speed		9.3	8.0	4.1		6.3	5.5	2.8		6.8	5.9	3.0		8.2	7.1	3.7		7.8	6.8	3.5

TABLE 6.1-BR

SEASONAL WIND DISTRIBUTION FREQUENCY AND WIND SPEED FOR TAMPA (1965-1969)

Direction	SPRING				SUMMER				FALL				WINTER				ANNUAL			
	Distribution Frequency %	Mean Wind Speed			Distribution Frequency %	Mean Wind Speed			Distribution Frequency %	Mean Wind Speed			Distribution Frequency %	Mean Wind Speed			Distribution Frequency %	Mean Wind Speed		
		MPH	Knots	m/Sec		MPH	Knots	m/Sec.		MPH	Knots	m/Sec		MPH	Knots	m/Sec		MPH	Knots	m/Sec
N	4.5	7.7	6.7	3.5	3.0	8.3	7.2	3.7	8.2	8.5	7.4	3.8	8.7	8.6	7.5	3.9	6.1	8.4	7.3	3.8
NNE	3.7	7.9	6.9	3.6	3.0	6.8	5.9	3.0	9.5	9.1	7.9	4.1	7.8	9.1	7.9	4.1	6.0	8.6	7.5	3.9
NE	5.3	8.8	7.6	3.9	5.5	7.1	6.2	3.2	11.6	9.1	7.9	4.1	8.3	9.1	7.9	4.1	7.7	8.6	7.5	3.9
ENE	7.7	8.4	7.3	3.8	9.2	7.0	6.1	3.1	14.8	8.6	7.5	3.9	9.3	8.2	7.1	3.7	10.2	8.2	7.1	3.7
E	14.4	9.7	8.4	4.3	15.7	7.1	6.2	3.2	14.8	8.8	7.6	3.9	11.2	8.3	7.2	3.7	14.0	8.4	7.3	3.8
ESE	7.0	9.6	8.3	4.3	8.7	7.5	6.5	3.4	5.1	8.3	7.2	3.7	5.0	8.6	7.5	3.9	6.5	8.4	7.3	3.8
SE	4.9	9.4	8.2	4.2	6.1	7.3	6.3	3.2	3.0	8.8	7.6	3.9	4.4	9.1	7.9	4.1	4.6	8.5	7.4	3.8
SSE	4.3	9.2	8.0	4.1	7.0	7.3	6.3	3.2	2.9	7.4	6.4	3.3	5.1	9.1	7.9	4.1	4.8	8.2	7.1	3.7
S	4.1	11.5	10.0	5.2	5.2	8.3	7.2	3.7	3.1	8.5	7.4	3.8	7.2	10.4	9.0	4.6	4.9	9.8	8.5	4.4
SSW	3.9	10.8	9.4	4.8	3.1	9.0	7.8	4.0	1.7	8.5	7.4	3.8	3.7	9.3	8.1	4.2	3.1	9.7	8.4	4.3
SW	3.1	9.8	8.5	4.4	3.6	8.4	7.3	3.8	1.7	7.8	6.8	3.5	1.6	8.5	7.4	3.8	2.5	8.8	7.6	3.9
WSW	4.6	9.9	8.6	4.4	6.0	8.5	7.4	3.8	2.5	8.2	7.1	3.7	2.1	7.8	6.8	3.5	3.8	8.8	7.6	3.9
W	11.1	11.5	10.0	5.2	11.6	9.3	8.1	4.2	5.4	8.9	7.7	4.0	5.0	9.1	7.9	4.1	8.3	10.0	8.7	4.5
WNW	6.0	10.1	8.8	4.5	2.8	8.4	7.3	4.3	2.8	9.4	8.2	4.2	3.1	10.6	9.2	4.7	3.7	9.8	8.5	4.4
NW	6.1	9.3	8.1	4.2	2.6	8.1	7.0	3.6	3.9	8.9	7.7	4.0	5.4	10.7	9.3	4.8	4.5	9.4	8.2	4.2
NNW	4.7	8.9	7.7	4.0	2.2	7.7	6.7	3.5	4.5	8.6	7.5	3.9	7.1	11.4	9.9	5.1	4.6	9.7	8.4	4.3
CALM	4.6				4.5				4.2				5.0				4.6			
Mean Wind Speed		9.0	7.8	4.0		7.4	6.4	3.4		8.1	7.0	3.6		8.7	7.6	3.9		8.4	7.3	3.8

Page	Paragraph & Line	Correction
22 (con't)	1-3 All	second, 13.0 miles per hour) was exceeded 13.6 percent of the time. The mean annual wind speed for Tampa (1965-1969) was 7.3 knots (3.8 meters per second, 8.4 miles per hour). The highest mean seasonal wind speed of 7.8 knots (4.0 meters per second, 9.0 miles per hour) was for the spring. The lowest wind speed of 6.4 knots (3.4 meters per second, 7.4 miles per hour) was in the summer. A wind speed of 10 knots (5.2 meters per second, 11.5 miles per hour) was exceeded 17.6 percent of the time. Table 6.1-C presents select wind speed and the percent of time these wind speeds were exceeded for the Tampa data base."
23	Table 6.1-C	Change "1.51" to "1.54"
24	2 2-12	Replace with "The mixing depth is the depth above the surface through which relatively vigorous vertical mixing occurs and relates to the dry adiabatic lapse rate. The ventilation factor is the mixing depth times the average wind speed through the mixing depth. Cubic meters of air available for dilution can be determined from this factor by multiplying it by a distance transverse to the wind. Table 6.3-A, lists mean seasonal mixing depths, mean wind speed through the mixing depth and ventilation factors for Tampa (NOAA, 1968). These were calculated from non-precipitation events as the assumption of a dry adiabatic lapse rate in the mixing layer becomes questionable when precipitation occurs (Holzworth, 1972)."

Page	Paragraph & Line		Correction
24 (con't)	2	2-12	Replace with "A mixing depth of 150 meters or less occurred 15.7 percent of the time from 1960 through 1964 and a mixing height of less than 120 meters can be expected about 10 percent of the time. The greatest occurrence of low mixing height conditions can be expected from October through May (NOAA, 1968). The average annual morning mixing depth is 493 meters for non-precipitation cases with an average wind speed of 5.3 meters/second. The average annual afternoon mixing depth is 1359 meters for non-precipitation cases with an average wind speed of 6.2 meters/second (Holzworth, 1972)."
27	Lines 1-8		Delete
29	1	1-4	Replace with "Tornados can occur anywhere in Florida. Lakeland and the proposed mine site lie within a 1° square (latitude - longitude) which recorded a total of 42 tornados between 1955 and 1967. During this same period of years, the month of June produced a maximum of 92 tornados in the entire State of Florida (Pautz, 1969)."

3.4 SOILS RESOURCE DOCUMENT

Page	Paragraph & Line		Correction
7	2	5	Change "over-burden" to "overburden"
8	1	13	Change "over-burden" to "overburden"
14	2	13	Change "or" to "on"
16	1	12	Change "CaO," to "CaO"
17	2	13	Change "over-burden" to "overburden"

3.5 RECLAMATION METHODOLOGY RESOURCE DOCUMENT

Page	Paragraph & Line		Correction
13	2	2-3	Delete "in the form of fixed structures (pipes) or". Insert "established by the"
15	2	15-16	Paragraph is out of place. Should appear under 3.6 Plant Site.
34	2	3	Change "approximatel" to "approximately"
38	3	4	Change "disign" to "design"
48	1	15	Change "of" to "on"
49	Table 7-A		Hardwood acreage before mining should read "5.8" not "0". Lakes precentage after reclamation should read "3.7" not "4.7"

3.6 RADIOLOGICAL ENVIRONMENT RESOURCE DOCUMENT

Page	Paragraph & Line		Correction
6	2	5	Change "exponeutial" to "exponential"
6	3	7	Change "radium-226" to "radium-228"
7	Fourth Line		Change "sufficiant" to "sufficient"
11	2	4	Change "this behavior" to "the behavior"
13	2	1	Change "ubitiqous" to "ubiquitous"
20	Figure 4.1-3		Ra-226 values are graphically presented approximately 20% higher than actual values. Text and related tables are correct.
26	3	3	Change "United State" to "United States"

Page	Paragraph & Line		Correction
46	Fifth Line		Change "may itself a source" to "may itself be a source"
50	First Line		Delete "of"
54	Last Line		Change "effeciency" to "efficiency"
55	Figure 2.1-1		Change "concentration" to "concentrate"
57	1	7	Change "the beneficiation plant, gamma" to "at the beneficiation plant gamma"
59	3	9	Change "1.9 pCi/l" to "1.9 pCi/g"
64	1	3	Change "is" to "are". Change "aspect" to "aspects"
65	4	6	Change "is" to "are"
67	Second Line		Change "paint" to "plant"
71	Second Column		Change "Gamma, R/hr" to "Gamma, μR/hr"
71	Fourth Column		Change "pCi/m s" to "pCi/m^2s"
77	2	4	Change "or" to "on"
79	3	2	Change "servies" to "services"
80	1	6	Change "oportunity" to "opportunity"
80	1	7	Change "fraction" to "fractionation"
83	4	1	Change "emisions" to "emissions"
83	9	3	Change "an" to "a"

3.7 SURFACE WATER QUALITY RESOURCE DOCUMENT

Page	Paragraph & Line	Correction
14	Table 2-D	Insert "Supplement to Tables 2-D and 2-F, Part I" after page 14.

Supplement to Tables 2-D and 2-F, PART I
Station 9 - Lake Manatee

Parameter	MANATEE COUNTY HEALTH DEPARTMENT Mar/ 77	June/ 77	Sept/ 77	Oct/ 77	Nov/ 77	Dec/ 77	Jan/ 78	Feb/ 78	Mar/ 78	June/ 78	USGS 1970 - 1976 Average
Biochemical Oxygen Demand	2	1	1			1			1	1	1.6
Chloride	12.5	13.9	8.0			14.5			10.5	14.5	
Coliform, Total (Colonies/100 ml)			5850	4900	4800	19000	4900	15000	3550		1204
Fecal			122	140	80	230	240	1100	70		
Color (PCU)	80	140	280			100			120	110	66
Dissolved Oxygen	8.4	6.9	4.6			8.4			7.1	6.4	7.3
Fluoride, as F	0.25	0.29	0.15			0.20			0.21	0.22	0.5
Hardness, as $CaCO_3$, Total											74
Nitrogen, as N, Total											0.82
Organic											0.58
Ammonia											0.05
Kjeldahl											0.63
Nitrate	0.08	0.15	0.18			0.13			0.13	0.12	0.17
pH	7.5	6.7	6.0			6.5			6.5	6.7	7.3
Phosphorus, as P, Total											0.52
Ortho	0.63	0.47	0.50			0.27			0.35	0.35	0.48
Residue, Total Non-filterable	0	11	27			16			14	9	
Total Filterable @ 105°C	103	170	85			177			143	132	
Specific Conductance, µmhos/cm											199
Temperature, °C	19	24	30			12.5			18.5	25.5	23.7
Total Organic Carbon											11.8
Turbidity, JTU											44

Page	Paragraph & Line	Correction
17	Table 2-F	Corrected by insert of Supplement described for page 14.
22	Table 2-H	Table 2-H was inadvertently reduced during printing. Original is available upon request.
25	Table 2-I	Remove italics from all entries under Fluoride.
33-34	Table 4.1-A	Change F.A.C. 17-22 standard for Chromium from "15" to "0.05 (Hexavalent)"; change F.A.C. 17-22 standard for Color from "1.0" to "15"; change F.A.C. 17-22 standard for Chlorine from "0.05" to "0.50 mg/l (minimum)"; change F.A.C. 17-3, Class III standard for Fluoride from "Marine Only" to "10.0 mg/l (freshwater), 5.0 mg/l (predominantly marine water)."
35	Second Column	Add superscript "9" after "Criteria"
35	Footnotes	Add footnote "9 General Criteria apply to all waters of the State except when otherwise noted"
37	Table 4.1-B	Substitute revised Table 4.1-BR for Table 4.1-B. Revised table includes corrected entries for color, pH and fluoride.
55	1 10	Change "State standard" to "EPA criterion"
74	1 5	Change "0.5 mg/l" to "0.40 mg/l"
75	Table 2-C Third Column	Change "0.034[a]" to "0.034 (NO_3 as N)[a]"
75	Table 2-C Third Column	Change "0.025[a]" to "0.025 (NH_4^+ as N)[a]"
79	2 6	Change "5" to "1.6"
113	2 3	Delete "and instantaneous"

Table 4.1-BR. Frequency of Variation with Water Quality Criteria.

Parameter (Agency/Criterion)	Station Identification Number								
	1	2	3	4	5	6	7	9	10
Physical Parameters									
Dissolved Oxygen (FDER, EPA/5.0*)	5 (12)**	6 (10)	8 (11)	6 (12)	0	1 (2)	23 (36)	1 (13)	8 (11)
Specific Conductance (FDER/500 μmhos/cm)	0	0	1 (13)	0	0	0	0	0	0
Total Suspended Solids (EPA/60 max; 30 avg. daily)	0 0	1 (11) 2 (11)	0 1 (13)	0 1 (14)	1 (2) 2 (2)	0 1 (2)	0 0	0 0	0 0
Color (EPA/75 PCU)	8 (12)	9 (10)	8 (11)	8 (12)	--	--	--	8 (9)	7 (9)
Major Cations and Anions									
pH (FDER/6.0-8.5)	0 (14)	3 (11)	0 (13)	0 (14)	0 (2)	0 (2)	6 (26)	0 (11)	1 (11)
Fluoride (FDER Class I-A, 1.5 mg/l)	0 (14)	0 (11)	0 (13)	0 (14)	0 (2)	0 (2)	0 (26)	0 (11)	0 (10)

* Units in milligrams/liter unless otherwise noted.
** Numbers in parentheses denote the total number of determinations
-- Denotes either no data or inconclusive results

Page	Paragraph & Line		Correction
116	1	11	Change "2.5 microns" to "2.2 microns"
116	1	12-17	Replace the sentence beginning with "With the known ....." with "Using an average particle size distribution representative of Florida phosphate slimes (Lamont, et al., 1975), it was estimated that 42 percent of the suspended solids would be removed. Hence, a maximum of 58 percent or 425 mg/l could be expected to enter the lowermost intake structure of 15.25 feet (MSL).
116	2	1-8	Delete
117	4	5	Delete "to the maximum level of 1.0 Platinum - Cobalt Unit (PCU) allowed by F.A.C. Chapter 17-22 (Public Water Supplies)."
119	2	13	Change "52 mg/l" to "425 mg/l"
119	2	15	Change "0.4 pCi/l" to "3.4 pCi/l"
120	First Line		Change "1.2 pCi/l" to "4.2 pCi/l"
127	Ninth Reference		Delete entire entry beginning with "Brune, G. M."
128	Bibliography		Insert the following reference after the fourth entry; "Lamont, W. E., J. T. McLendon, L. W. Clements, Jr., and I. L. Feld. 1975. Characterization Studies of Florida Phosphate Slimes. U.S. Department of Interior, Bureau of Mines, Tuscalossa, Metallurgy Research Laboratory, University, Alabama."
APPENDIX E	Figure 4		Insert Figure 4 following Figure 3.

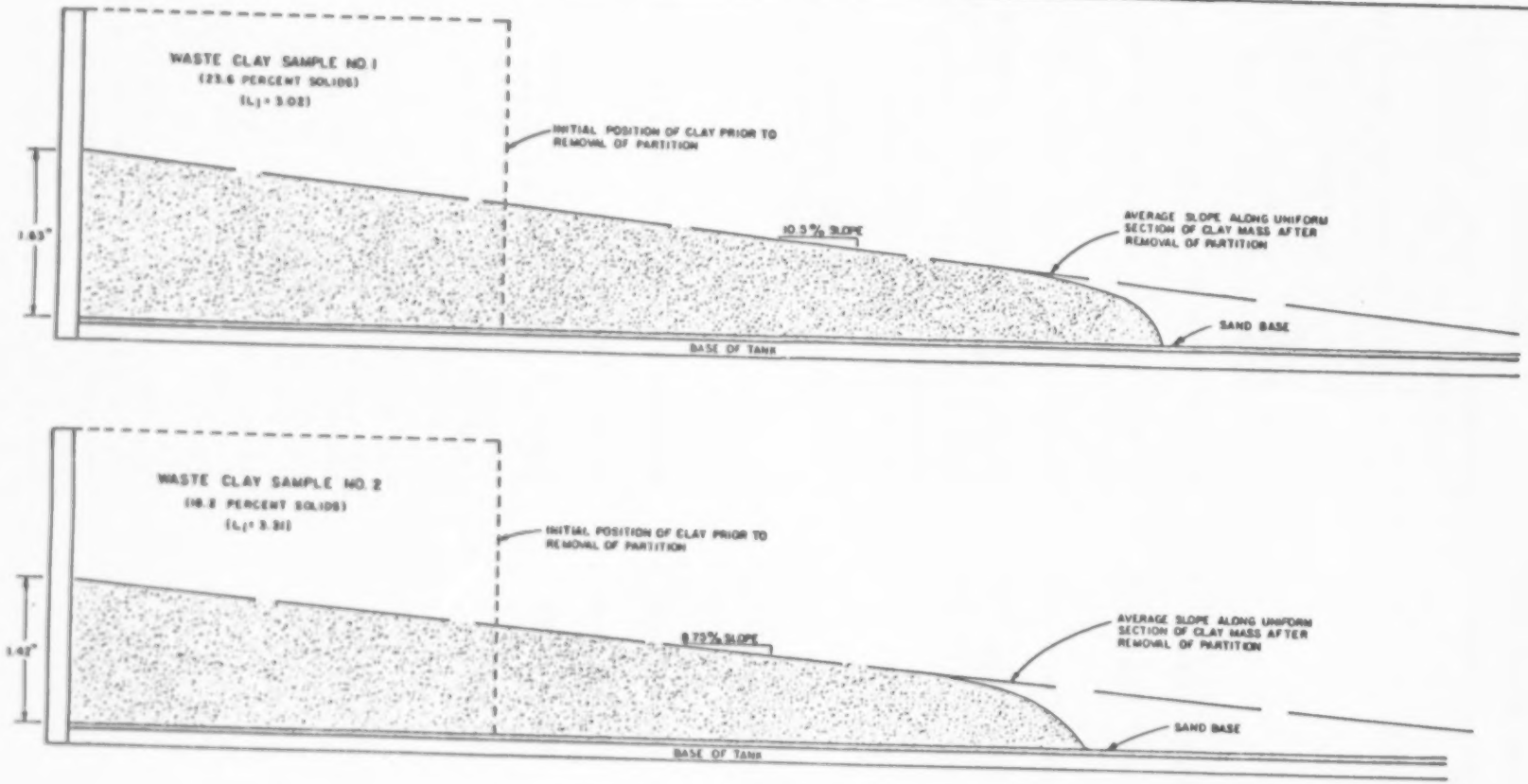


FIGURE 4

INITIAL AND FINAL POSITIONS OF WASTE CLAY SAMPLES 1 AND 2 IN TANK EXPERIMENTS
(SCALE: 1" = 1")

Ardaman & Associates, Inc.
Consulting Engineers in Soil Mechanics, Foundations, and Material Testing

IMPACT EVALUATION OF HYPOTHETICAL SETTLING AREA FAILURE
SWIFT - BOTTLE MINE
MANATEE COUNTY, FLORIDA

DRAWN BY: R.C. CHECKED BY: [illegible] DATE: 6/29/75
FILE NO. 74-027 APPROVED BY: [illegible]

Page	Paragraph & Line	Correction
APPENDIX F	First Page	Replace last seven lines with "ρ_s = mean particle density = 169 lbm/ft^3 based on average density of slimes from fifteen Florida phosphate mines (Lamont, et al., 1975). ρ = density of water = 62.2 lbm/ft^3 at 80 F
APPENDIX F	Second Page 5	Change "2.514" to "3.229"
APPENDIX F	Second Page 6	Delete entire description in STEP 2.
APPENDIX F	Second Page 17	Change "STEP 3" to "STEP 2"
APPENDIX F	Second Page 17	Replace description in STEP 3 with "STEP 3: Compute critical particle diameter, d_c, corresponding to critical velocity using equation from STEP 1. $d_c = \left[\frac{0.001046 \text{ ft/min}}{(60 \text{ ft/sec})(3.229 \times 10^5)}\right]^{1/2}$ = 7.348 ft = 2.2 microns"
APPENDIX F	Third Page	Replace Figure 1 with Figure 1R
APPENDIX F	Fourth Page	Delete Figure 2
APPENDIX F	Fifth Page	Replace description in STEP 4 with "STEP 4: Determine percent of suspended solids removed from Particle Size Distribution Curve. The estimated waste clay particle size distribution is shown in Figure 1. This is based on the average distribution of particle sizes in slime samples from fifteen Florida phosphate mines (Lamont, et al., 1975). The percent of suspended solids entrapped in the reservoir was estimated by first entering the abscissa of the distribution curve with $\log_{10}$ 2.2 microns

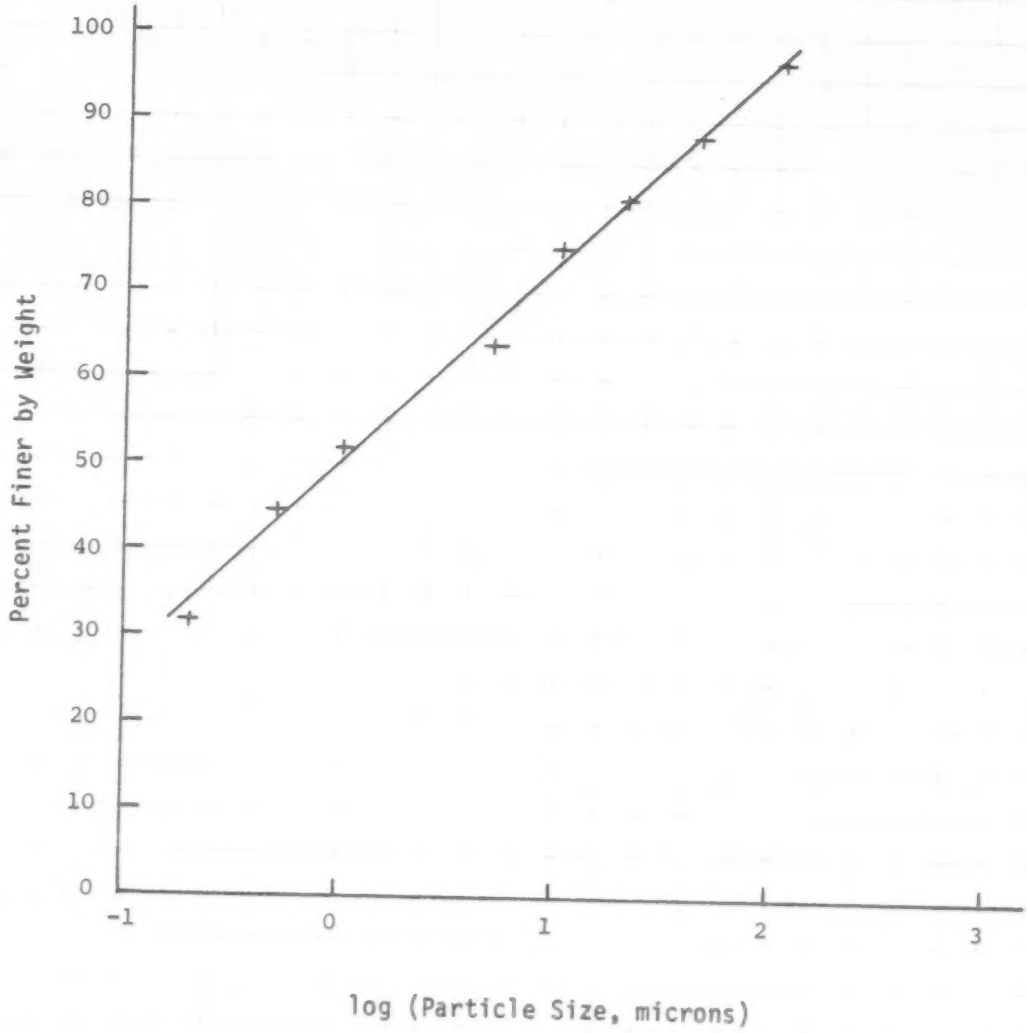


FIGURE 1R

AVERAGE PARTICLE SIZE DISTRIBUTION OF WASTE CLAYS FROM FLORIDA PHOSPHATE MINES.

Source: Lamont, W. E. et al., U.S. Bureau of Mines, 1975.

Page	Paragraph & Line	Correction
APPENDIX F (con't)		and reading the percent finer by weight on the ordinate. Then: Percent of TSS entrapped = 100 - (percent finer by weight) = 100 - 58 = 42 percent"
APPENDIX F	Fifth Page	Add "STEP 5: Compute suspended soilds concentration at treatment plant intake structure. TSS_{intake} = (0.42)(730 mg/l) = 425 mg/l"

3.8 DESCRIPTION OF THE PROPOSED ACTIVITY RESOURCE DOCUMENT

Page	Paragraph & Line	Correction
i	Table of Contents	Change "Waste Peeble" to "Waste Pebble". Change "Peeble Product" to "Pebble Product"
4	3 6	Change "recovers" to "recovery"
9	Seventh Line	Change "form" to "from"

3.9 AIR QUALITY RESOURCE DOCUMENT

Page	Paragraph & Line	Correction
70	3 2	Change "4.7 micrograms" to "less than 4.7 micrograms"
71	Figure 6.1-4	Replace with Figure 6.1-4R. Revised figure includes proposed source contributions at points where influence from external interactive sources are expected to be greatest.
74	2 4	Change "of" to "in"
76	2 5	Change "next highest was produced" to "next highest, 61.3 micrograms per cubic meter, was produced"

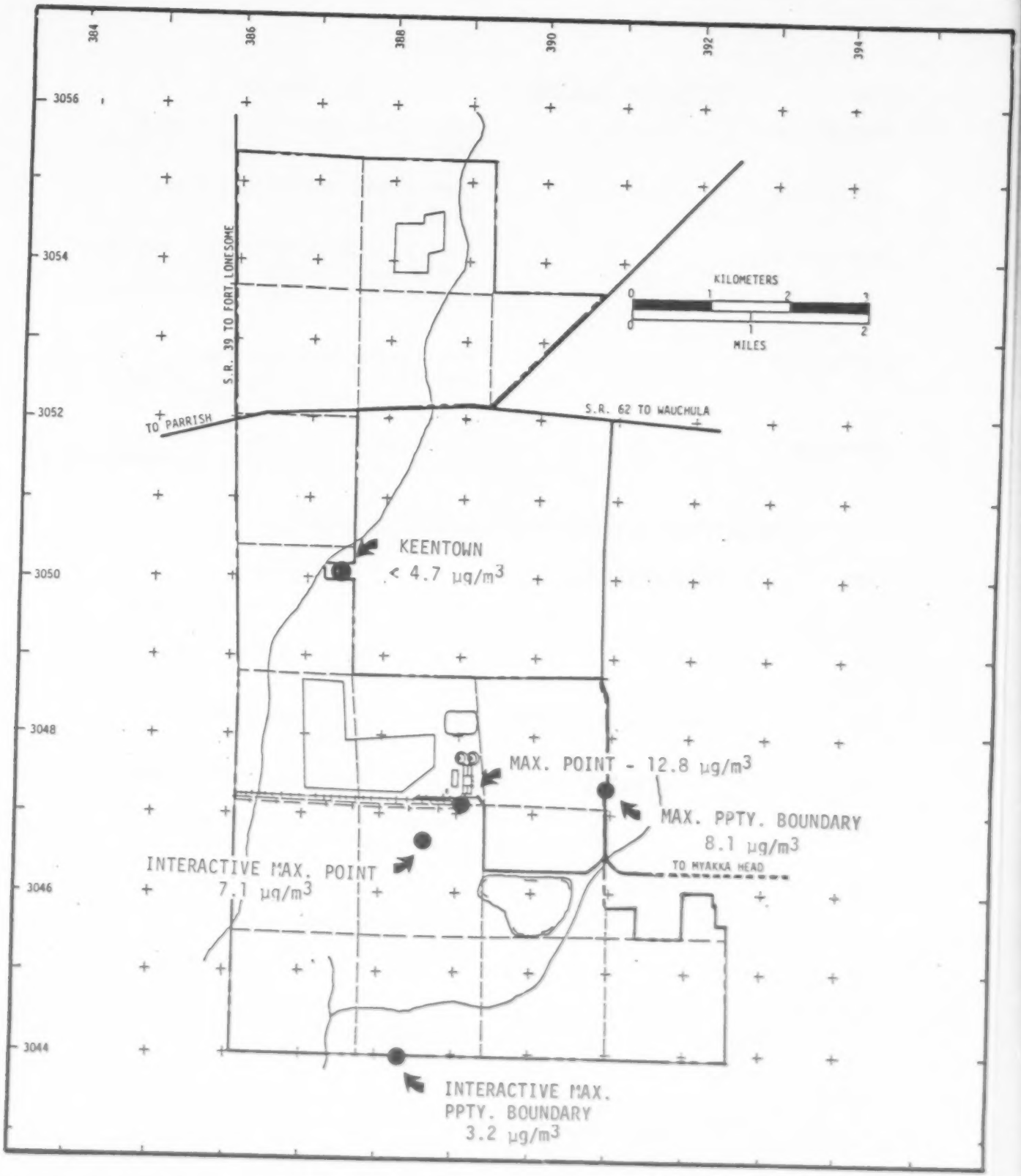
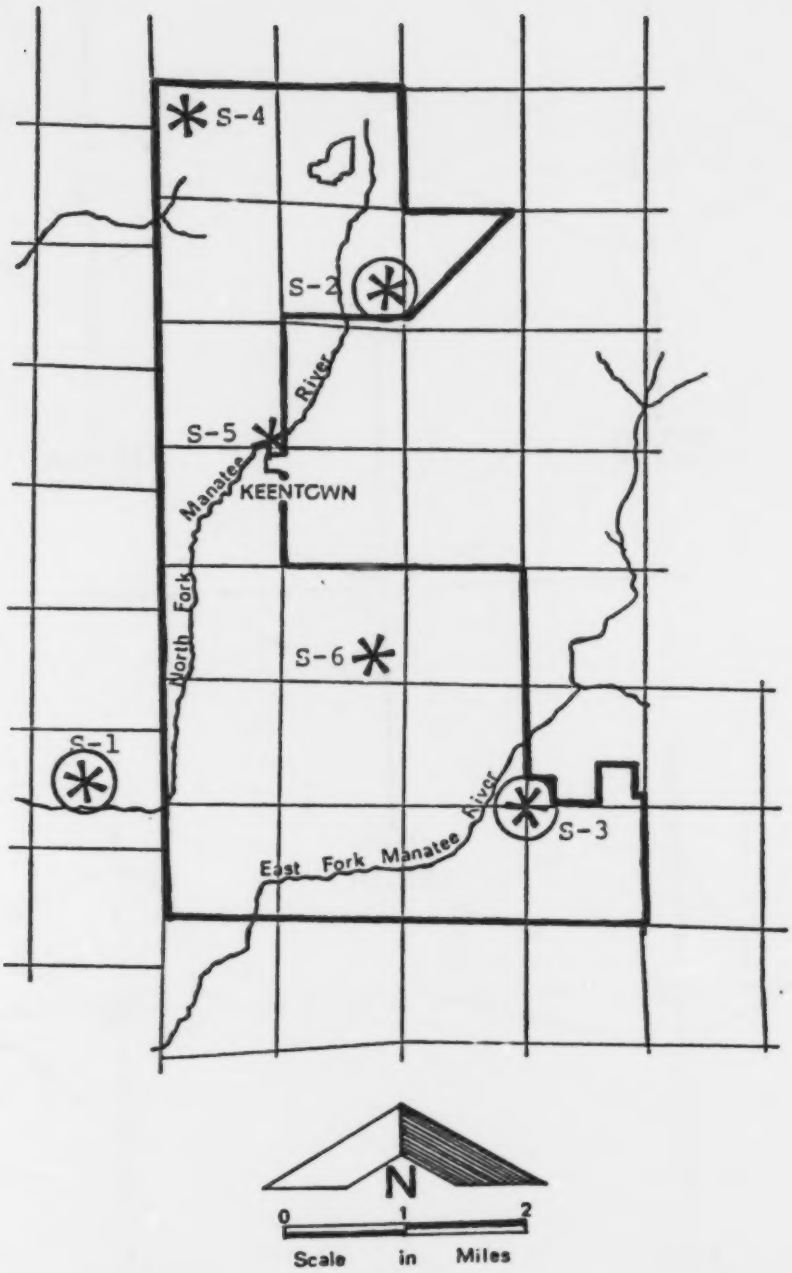


FIGURE 6.1 - 4R
SHORT TERM (24-HOUR) EFFECTS OF PROPOSED SOURCE PARTICULATE EMISSIONS

Page	Paragraph & Line	Correction
APPENDIX A	Page 1	Page 1 was omitted. Insert page 1
APPENDIX A	Page 5	Page 5 was omitted. Insert page 5
APPENDIX D		Insert AQDM OUTPUT (D-2 through D-20) immediately following APPENDIX D TSP MODELING DATA.
APPENDIX E		Substitute E-2 for page immediately following APPENDIX E SO_2 & NO_x MODELING DATA.
APPENDIX E		Substitute E-9, E-10 and E-11 for last three pages of APPENDIX E.

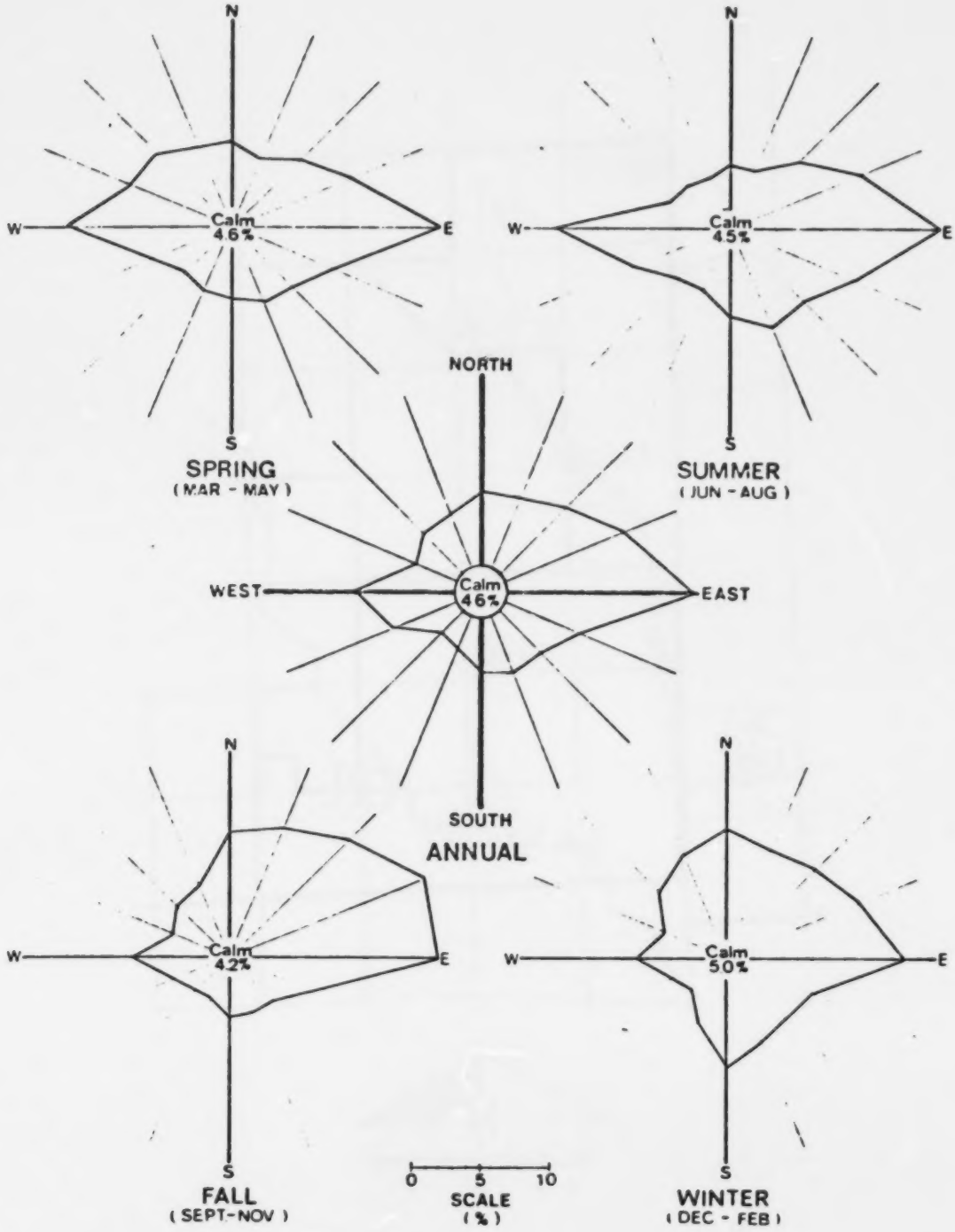
3.10 ALTERNATIVES EVALUATION RESOURCE DOCUMENT

Page	Paragraph & Line		Correction
19	2	8	Change "effect" to "affect"
19	4	9	Change "dissication" to "desiccation"
22	Seventeenth Line		Change "distrubances" to "disturbances"
25	Sixth Line		Change "recover" to "recovery"
26	1	3	Change "insoluable" to "insoluble"
26	1	8	Change "slimed" to "slimes"
32	7	5	Delete "higher"
48	Table 11-A	Third Column	Change "19.000" to "19,000"
57	Item 1)	2	Change "condesation" to "condensation"



PRIMARY SITE TSP_1, SO_2, F^-_{atm}, F^-_{veg}

SECONDARY SITE F^-_{veg}



SEASONAL WIND ROSES FOR TAMPA, 1964-1969

AQDM OUTPUT

BASELINE (1977) ANNUAL PROJECTIONS

[illegible] STAR MET DATA

[illegible] FIVE SELECTED RECEPTORS

[illegible] PARTICULATES

[illegible] METER

[illegible]	RECEPTOR [illegible]	RECEPTOR [illegible]	RECEPTOR 228	RECEPTOR 229	RECEPTOR 230
232	3.[illegible] %	2.33 %	2.04 %	3.35 %	2.57 %
	[illegible]	0.0121	0.0136	0.0173	[illegible]
233	7.[illegible] %	5.54 %	5.06 %	7.56 %	6.35 %
	0.0459	0.0299	0.0251	0.0427	0.0335
234	0.47 %	0.57 %	0.55 %	0.49 %	0.61 %
	0.0027	0.0030	0.0029	0.0028	0.0032
235	0.47 %	0.57 %	0.55 %	0.49 %	0.61 %
	0.0027	0.0030	0.0029	0.0028	0.0032
236	0.47 %	0.57 %	0.55 %	0.49 %	0.60 %
	0.0027	0.0030	0.0029	0.0028	0.0032
237	0.46 %	0.56 %	0.55 %	0.49 %	0.60 %
	0.0026	0.0029	0.0028	0.0028	0.0032
238	0.46 %	0.56 %	0.55 %	0.49 %	0.60 %
	0.0026	0.0029	0.0028	0.0028	0.0032
239	0.47 %	0.57 %	0.55 %	0.50 %	0.61 %
	0.0027	0.0030	0.0029	0.0028	0.0032
BACK-GROUND	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
	0.	0.	0.	0.	0.
TOTAL	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %
	0.5722	0.5259	0.5194	0.5650	0.5285
	KT	MP	WPB	NPB	EPB

POST CONSTRUCTION (1982) AND

INCREMENT CONSUMING SOURCE PROJECTIONS

PROJECTIONS 1969-1973 STAR MET DAT

RECEPTOR CONCENTRATION DATA

[illegible]	RECEPTOR LOCATION (KILOMETERS) HORIZ	VERT	EXPECTED ARITHMETIC MEAN (MICROGRAMS/CU. METER) SO2	PARTICULATES
1	[illegible]	3042.8	0.	1.
	[illegible]	3043.8	0.	1.
	[illegible]	[illegible]	0.	1.
	[illegible]	[illegible]	0.	1.
	[illegible]	[illegible]	0.	1.
	[illegible]	[illegible]	0.	1.
	[illegible]	3048.8	0.	1.
	384.[illegible]	3049.8	0.	1.
	[illegible]	3050.8	0.	1.
	[illegible]	3051.8	0.	1.
	[illegible]	3042.8	0.	1.
	385.4	3043.8	0.	1.
13	385.4	3044.8	0.	1.
14	385.4	3045.8	0.	1.
15	385.4	3046.8	0.	1.
16	385.4	3047.8	0.	1.
[illegible]	385.4	3048.8	0.	1.
18	385.4	3049.8	0.	1.
19	385.4	3050.8	0.	1.
20	385.4	3051.8	0.	1.
21	386.4	3042.8	0.	1.
22	386.4	3043.8	0.	1.
23	386.4	[illegible]	0.	1.
24	386.4	3045.8	0.	1.
	386.4	3046.8	0.	1.
	386.4	3047.8	0.	1.
	386.4	3048.8	0.	1.
	386.4	3049.8	0.	1.
	386.4	3050.8	0.	1.
	386.4	3051.8	0.	1.
31	387.4	3042.8	0.	1.
32	387.4	3043.8	0.	1.
33	387.4	3044.8	0.	1.
34	387.4	3045.8	0.	1.
35	387.4	3046.8	0.	1.
36	387.4	3047.8	0.	1.
37	387.4	3048.8	0.	1.
38	387.4	3049.8	0.	1.
	[illegible]	3050	0.	1.
	[illegible]	3051.	0.	1.

SACC DUETTE MINE 1982 PROJECTIONS 1969-1973 STAR MET DATA

7-26-79
(73)

RECEPTOR CONCENTRATION DATA

RECEPTOR NUMBER	RECEPTOR LOCATION (KILOMETERS) HORIZ	VERT	EXPECTED ARITHMETIC MEAN (MICROGRAMS/CU. METER) SO2	PARTICULATES
41	388.4	3042.8	0.	1.
42	388.4	3043.8	0.	1.
43	388.4	3044.8	0.	1.
44	388.4	3045.8	0.	1.
45	388.4	3046.8	0.	1.
46	388.4	3047.8	0.	1.
47	388.4	3048.8	0.	1.
48	388.4	3049.8	0.	1.
49	388.4	3050.8	0.	1.
50	388.4	3051.8	0.	1.
51	389.4	3042.8	0.	1.
52	389.4	3043.8	0.	1.
53	389.4	3044.8	0.	1.
54	389.4	3045.8	0.	1.
55	389.4	3046.8	0.	1.
56	389.4	3047.8	0.	1.
57	389.4	3048.8	0.	1.
58	389.4	3049.8	0.	1.
59	389.4	3050.8	0.	1.
60	389.4	3051.8	0.	1.
61	390.4	3042.8	0.	1.
62	390.4	3043.8	0.	1.
63	390.4	3044.8	0.	1.
64	390.4	3045.8	0.	1.
65	390.4	3046.8	0.	1.
66	390.4	3047.8	0.	1.
67	390.4	3048.8	0.	1.
68	390.4	3049.8	0.	1.
69	390.4	3050.8	0.	1.
70	390.4	3051.8	0.	1.
71	391.4	3042.8	0.	1.
72	391.4	3043.8	0.	1.
73	391.4	3044.8	0.	1.
74	391.4	3045.8	0.	1.
75	391.4	3046.8	0.	1.
76	391.4	3047.8	0.	1.
77	391.4	3048.8	0.	1.
78	391.4	3049.8	0.	1.
79	391.4	3050.8	0.	1.
80	391.4	3051.8	0.	1.

7-26-79

SACC DUETTE MINE 1982 PROJECTIONS 1969-1973 STAR MET DATA

RECEPTOR CONCENTRATION DATA

RECEPTOR NUMBER	RECEPTOR LOCATION (KILOMETERS) HORIZ	VERT	EXPECTED ARITHMETIC MEAN (MICROGRAMS/CU. METER) SO2	PARTICULATES
81	392.4	3042.8	0.	1.
82	392.4	3043.8	0.	1.
83	392.4	3044.8	0.	1.
84	392.4	3045.8	0.	1.
85	392.4	3046.8	0.	1.
86	392.4	3047.8	0.	1.
87	392.4	3048.8	0.	1.
88	392.4	3049.8	0.	1.
89	392.4	3050.8	0.	1.
90	392.4	3051.8	0.	1.
91	393.4	3042.8	0.	1.
92	393.4	3043.8	0.	1.
93	393.4	3044.8	0.	1.
94	393.4	3045.8	0.	1.
95	393.4	3046.8	0.	1.
96	393.4	3047.8	0.	1.
97	393.4	3048.8	0.	1.
98	393.4	3049.8	0.	1.
99	393.4	3050.8	0.	1.
100	393.4	3051.8	0.	1.
101	394.4	3042.8	0.	1.
102	394.4	3043.8	0.	1.
103	394.4	3044.8	0.	1.
104	394.4	3045.8	0.	1.
105	394.4	3046.8	0.	1.
106	394.4	3047.8	0.	1.
107	394.4	3048.8	0.	1.
108	394.4	3049.8	0.	1.
109	394.4	3050.8	0.	1.
110	394.4	3051.8	0.	1.
111	395.4	3042.8	0.	1.
112	395.4	3043.8	0.	1.
113	395.4	3044.8	0.	1.
114	395.4	3045.8	0.	1.
115	395.4	3046.8	0.	1.
116	395.4	3047.8	0.	1.
117	395.4	3048.8	0.	1.
118	395.4	3049.8	0.	1.
119	395.4	3050.8	0.	1.
120	395.4	3051.8	0.	1.

D-8

SACC JUETTE MINE 1982 PROJECTIONS 1969-1973 STAR MET DATA

RECEPTOR CONCENTRATION DATA

RECEPTOR NUMBER	RECEPTOR LOCATION (KILOMETERS) HORIZ	VERT	EXPECTED ARITHMETIC MEAN (MICROGRAMS/CU. METER) SO2	PARTICULATES
121	396.4	3042.8	0.	1.
122	396.4	3043.8	0.	1.
123	396.4	3044.8	0.	1.
124	396.4	3045.8	0.	1.
125	396.4	3046.8	0.	1.
126	396.4	3047.8	0.	1.
127	396.4	3048.8	0.	1.
128	396.4	3049.8	0.	1.
129	396.4	3050.8	0.	1.
130	396.4	3051.8	0.	1.
131	397.4	3042.8	0.	1.
132	397.4	3043.8	0.	1.
133	397.4	3044.8	0.	1.
134	397.4	3045.8	0.	1.
135	397.4	3046.8	0.	1.
136	397.4	3047.8	0.	1.
137	397.4	3048.8	0.	1.
138	397.4	3049.8	0.	1.
139	397.4	3050.8	0.	1.
140	397.4	3051.8	0.	1.
141	398.4	3042.8	0.	1.
142	398.4	3043.8	0.	1.
143	398.4	3044.8	0.	1.
144	398.4	3045.8	0.	1.
145	398.4	3046.8	0.	1.
146	398.4	3047.8	0.	1.
147	398.4	3048.8	0.	1.
148	398.4	3049.8	0.	1.
149	398.4	3050.8	0.	1.
150	398.4	3051.8	0.	1.
151	386.2	3047.3	0.	1.
152	388.8	3048.7	0.	1.
153	391.0	3047.3	0.	1.
154	388.8	3043.9	0.	1.
155	386.9	3047.3	0.	2.
156	387.4	3047.3	0.	2.
157	387.9	3047.3	0.	2.
158	386.9	3046.8	0.	1.
159	387.9	3046.8	0.	2.
160	386.9	3046.3	0.	1.

SACC DUETTE MINE 1982 PROJECTIONS 1960-1973 STAR MET DATA

7-26-79

(16)

RECEPTOR CONCENTRATION DATA

RECEPTOR NUMBER	RECEPTOR LOCATION (KILOMETERS) HORIZ	VERT	EXPECTED ARITHMETIC MEAN (MICROGRAMS/CU. METER) SO2	PARTICULATES
161	387.4	3046.3	0.	1.
162	387.9	3046.3	0.	1.

A-2

A-1
7-26-79
29

SACC DUETTE MINE 1982 PROJECTIONS 1969-1973 STAR MET DATA

SOURCE CONTRIBUTIONS TO FIVE SELECTED RECEPTORS

ANNUAL PARTICULATES

MICROGRAMS PER CUBIC METER

SOURCE	RECEPTOR 151	RECEPTOR 152	RECEPTOR 153	RECEPTOR 154	RECEPTOR 104	
253	0.09 %	0.09 %	0.09 %	0.14 %	0.11 %	
	0.0013	0.0011	0.0011	0.0014	0.0011	
254	0.02 %	0.02 %	0.02 %	0.03 %	0.02 %	
	0.0003	0.0002	0.0002	0.0003	0.0002	
255	0.01 %	0.01 %	0.01 %	0.02 %	0.02 %	
	0.0002	0.0002	0.0002	0.0002	0.0002	
256	0.01 %	0.01 %	0.01 %	0.01 %	0.01 %	
	0.0001	0.0001	0.0001	0.0001	0.0001	
257	0.01 %	0.01 %	0.01 %	0.02 %	0.02 %	
	0.0002	0.0002	0.0002	0.0002	0.0002	
258	0.01 %	0.01 %	0.01 %	0.01 %	0.01 %	
	0.0001	0.0001	0.0001	0.0001	0.0001	
259	0.17 %	0.16 %	0.16 %	0.27 %	0.21 %	
	0.0024	0.0021	0.0021	0.0025	0.0021	
260	1.87 %	3.23 %	2.52 %	1.51 %	2.76 %	
	0.0253	0.0427	0.0336	0.0143	0.0273	
261	1.87 %	3.23 %	2.52 %	1.51 %	2.76 %	
	0.0263	0.0427	0.0336	0.0143	0.0273	
262	0.03 %	0.03 %	0.03 %	0.04 %	0.03 %	
	0.0004	0.0004	0.0004	0.0003	0.0003	
263	0.14 %	0.15 %	0.13 %	0.17 %	0.16 %	
	0.0020	0.0020	0.0019	0.0016	0.0016	
264	9.41 %	5.86 %	12.52 %	4.06 %	3.32 %	SACC # 1
	0.1320	0.0775	0.1664	0.0387	0.0329	
265	16.67 %	10.79 %	9.95 %	5.25 %	2.65 %	SACC # 2
	0.2337	0.1429	0.1323	0.0500	0.0263	
266	7.53 %	6.30 %	4.44 %	2.37 %	1.14 %	SACC # 3
	0.1055	0.0833	0.0591	0.0226	0.0113	
267	0.22 %	0.23 %	0.26 %	0.40 %	0.42 %	
	0.0031	0.0030	0.0034	0.0038	0.0041	
268	0.22 %	0.23 %	0.26 %	0.40 %	0.42 %	
	0.0031	0.0030	0.0034	0.0038	0.0041	
269	0.22 %	0.22 %	0.26 %	0.40 %	0.42 %	
	0.0031	0.0030	0.0034	0.0038	0.0041	
270	0.22 %	0.22 %	0.25 %	0.40 %	0.41 %	
	0.0030	0.0029	0.0034	0.0038	0.0041	
271	0.22 %	0.22 %	0.25 %	0.40 %	0.41 %	
	0.0030	0.0029	0.0034	0.0038	0.0041	
272	0.22 %	0.23 %	0.26 %	0.40 %	0.42 %	
	0.0031	0.0030	0.0034	0.0038	0.0042	
273	0.51 %	0.55 %	0.63 %	0.74 %	0.91 %	
	0.0071	0.0072	0.0084	0.0070	0.0091	

7-26-79

SACC OUETTE MINE 1982 PROJECTIONS 1969-1973 STAR MET DATA

SOURCE CONTRIBUTIONS TO FIVE SELECTED RECEPTORS

ANNUAL PARTICULATES

MICROGRAMS PER CUBIC METER

SOURCE	RECEPTOR 151	RECEPTOR 152	RECEPTOR 153	RECEPTOR 154	RECEPTOR 104
274	0.82 %	0.88 %	1.02 %	1.19 %	1.47 %
	0.0115	0.0116	0.0136	0.0113	0.0146
BACK-	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
GROUND	0.	0.	0.	0.	0.
TOTAL	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %
	1.4022	1.3238	1.3297	0.9521	0.9924

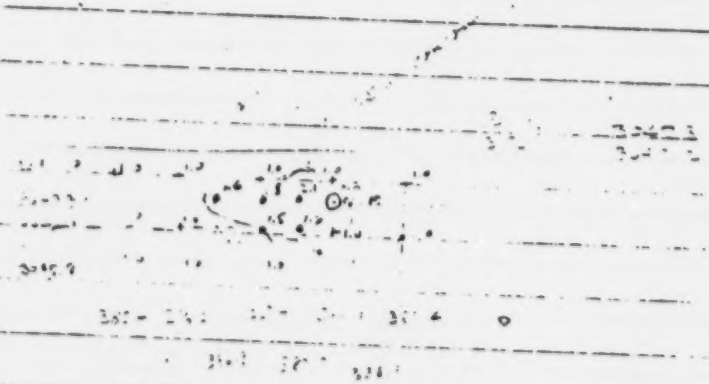
A-1

[illegible] 1978 [illegible] STAR MET DATA

7-31-79

RECEPTOR CONCENTRATION DATA				
RECEPTOR NUMBER	RECEPTOR LOCATION (KILOMETERS)		EXPECTED ARITHMETIC MEAN (MICROGRAMS/CU. METER)	
	HORIZ	VERT	SO2	PARTICULATES
1	387.4	3046.8	0.	1.
2	387.4	3047.3	0.	2.
3	387.9	3046.8	0.	2.
4	387.9	3047.3	0.	2.
5	385.9	3047.3	0.	2.

MAX



7-30-79 A-21

[illegible] 1982 PROJECTIONS 1969-1973 STAR MET DATA

[illegible] CONTRIBUTIONS TO FIVE SELECTED RECEPTORS

ANNUAL PARTICULATES

MICROGRAMS PER CUBIC METER

SOURCE	RECEPTOR 1	RECEPTOR 2	RECEPTOR 3	RECEPTOR 4	RECEPTOR 5	
253	0.09 %	0.07 %	0.08 %	0.06 %	0.08 %	
	0.0013	0.0012	0.0013	0.0012	0.0013	
254	0.02 %	0.01 %	0.02 %	0.01 %	0.02 %	
	0.0003	0.0003	0.0003	0.0003	0.0003	
255	0.01 %	0.01 %	0.01 %	0.01 %	0.01 %	
	0.0002	0.0002	0.0002	0.0002	0.0002	
256	0.01 %	0.01 %	0.01 %	0.01 %	0.01 %	
	0.0001	0.0001	0.0001	0.0001	0.0001	
257	0.01 %	0.01 %	0.01 %	0.01 %	0.01 %	
	0.0002	0.0002	0.0002	0.0002	0.0002	
258	0.01 %	0.01 %	0.01 %	0.01 %	0.01 %	
	0.0001	0.0001	0.0001	0.0001	0.0001	
259	0.16 %	0.13 %	0.15 %	0.11 %	0.15 %	
	0.0024	0.0023	0.0023	0.0023	0.0023	
260	1.63 %	1.60 %	1.60 %	1.43 %	1.75 %	
	0.0262	0.0290	0.0254	0.0299	0.0279	
261	1.63 %	1.60 %	1.60 %	1.43 %	1.75 %	
	0.0262	0.0290	0.0254	0.0299	0.0279	
262	0.03 %	0.02 %	0.03 %	0.02 %	0.03 %	
	0.0004	0.0004	0.0004	0.0004	0.0004	
263	0.13 %	0.11 %	0.12 %	0.09 %	0.12 %	
	0.0019	0.0019	0.0019	0.0019	0.0019	
264	7.17 %	8.81 %	5.25 %	6.51 %	9.59 %	SACC #1
	0.1047	0.1597	0.0835	0.1365	0.1529	
265	17.02 %	24.00 %	17.17 %	24.09 %	20.63 %	SACC #2
	0.2531	0.4351	0.2731	0.5049	0.3289	
266	13.69 %	14.99 %	19.16 %	23.99 %	10.75 %	SACC #3 0
	0.2036	0.2718	0.3049	0.5027	0.1713	
267	0.22 %	0.17 %	0.21 %	0.15 %	0.20 %	
	0.0032	0.0032	0.0033	0.0032	0.0031	
268	0.22 %	0.17 %	0.21 %	0.15 %	0.20 %	
	0.0032	0.0032	0.0033	0.0032	0.0031	
269	0.22 %	0.17 %	0.20 %	0.15 %	0.19 %	
	0.0032	0.0031	0.0033	0.0032	0.0031	
270	0.21 %	0.17 %	0.20 %	0.15 %	0.19 %	
	0.0032	0.0031	0.0032	0.0031	0.0031	
271	0.21 %	0.17 %	0.20 %	0.15 %	0.19 %	
	0.0032	0.0031	0.0032	0.0031	0.0031	
272	0.22 %	0.17 %	0.21 %	0.15 %	0.20 %	
	0.0032	0.0032	0.0033	0.0032	0.0031	
273	0.48 %	0.41 %	0.45 %	0.36 %	0.46 %	
	0.0071	0.0074	0.0072	0.0075	0.0073	

D-14

7-31-79

25

[illegible] MINE 1982 PROJECTIONS 1969-1973 STAR MET DATA

[illegible] CONTRIBUTIONS TO FIVE SELECTED RECEPTORS

ANNUAL PARTICULATES

[illegible] PER CUBIC METER

SOURCE	RECEPTOR 1	RECEPTOR 2	RECEPTOR 3	RECEPTOR 4	RECEPTOR 5
[illegible]	0.77 %	0.66 %	0.73 %	0.58 %	0.74 %
	0.0115	0.0119	0.0117	0.0122	0.0117
[illegible]	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
[illegible]	0.	0.	0.	0.	0.
TOTAL	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %
	1.4973	1.8134	1.5915	2.0564	1.5941

SACC OUETTE MINE 1982 PROJECTIONS 1969-1973 STAR MET DATA

8-4-74

RECEPTOR CONCENTRATION DATA

RECEPTOR NUMBER	RECEPTOR LOCATION (KILOMETERS) HORIZ	VERT	EXPECTED ARITHMETIC MEAN (MICROGRAMS/CU. METER) SO2	PARTICULATES
1	387.6	3049.0	0.	1.
2	387.6	3050.0	0.	1.
3	388.6	3049.0	0.	1.
4	388.6	3050.0	0.	1.
5	388.8	3048.7	0.	1.
6	391.0	3047.3	0.	1.
7	387.9	3047.3	0.	2.
8	388.4	3047.3	0.	2.

D-16

SACC DUETTE MINE 1982 PROJECTIONS 1969-1973 STAR MET DATA

SOURCE CONTRIBUTIONS TO FIVE SELECTED RECEPTORS

ANNUAL PARTICULATES

MICROGRAMS PER CUBIC METER

SOURCE	RECEPTOR 1	RECEPTOR 2	RECEPTOR 3	RECEPTOR 4	RECEPTOR 5	
253	0.09 %	0.09 %	0.09 %	0.09 %	0.08 %	
	0.0011	0.0011	0.0011	0.0011	0.0011	
254	0.02 %	0.02 %	0.02 %	0.02 %	0.02 %	
	0.0002	0.0002	0.0002	0.0002	0.0002	
255	0.01 %	0.01 %	0.01 %	0.01 %	0.01 %	
	0.0002	0.0002	0.0002	0.0002	0.0002	
256	0.01 %	0.01 %	0.01 %	0.01 %	0.01 %	
	0.0001	0.0001	0.0001	0.0001	0.0001	
257	0.01 %	0.01 %	0.01 %	0.01 %	0.01 %	
	0.0002	0.0002	0.0002	0.0002	0.0002	
258	0.01 %	0.01 %	0.01 %	0.01 %	0.01 %	
	0.0001	0.0001	0.0001	0.0001	0.0001	
259	0.17 %	0.16 %	0.16 %	0.16 %	0.16 %	
	0.0021	0.0020	0.0021	0.0020	0.0021	
260	3.59 %	4.46 %	3.47 %	4.29 %	3.22 %	
	0.0549	0.0539	0.0551	0.0533	0.0527	
261	3.59 %	4.46 %	3.47 %	4.29 %	3.22 %	
	0.0549	0.0539	0.0551	0.0533	0.0527	
262	0.03 %	0.04 %	0.03 %	0.03 %	0.03 %	
	0.0006	0.0006	0.0006	0.0006	0.0006	
263	0.16 %	0.17 %	0.15 %	0.16 %	0.15 %	
	0.0020	0.0021	0.0020	0.0020	0.0020	
264	5.29 %	4.27 %	5.75 %	4.81 %	5.84 %	SACC #1
	0.0662	0.0516	0.0749	0.0598	0.0775	
265	8.61 %	5.24 %	9.58 %	5.95 %	10.75 %	SACC #2
	0.1077	0.0633	0.1245	0.0740	0.1428	
266	4.23 %	2.18 %	5.13 %	2.67 %	6.28 %	SACC #3
	0.0529	0.0263	0.0666	0.0332	0.0833	
267	0.15 %	0.09 %	0.21 %	0.11 %	0.34 %	SACC #4
	0.0019	0.0011	0.0028	0.0013	0.0045	
268	0.23 %	0.22 %	0.22 %	0.22 %	0.22 %	
	0.0029	0.0027	0.0029	0.0027	0.0030	
269	0.23 %	0.22 %	0.22 %	0.22 %	0.22 %	
	0.0029	0.0027	0.0029	0.0027	0.0030	
270	0.23 %	0.22 %	0.22 %	0.22 %	0.22 %	
	0.0028	0.0027	0.0025	0.0027	0.0030	
271	0.23 %	0.22 %	0.22 %	0.21 %	0.22 %	
	0.0028	0.0026	0.0029	0.0027	0.0029	
272	0.23 %	0.22 %	0.22 %	0.21 %	0.22 %	
	0.0028	0.0026	0.0029	0.0027	0.0029	
273	0.23 %	0.22 %	0.22 %	0.22 %	0.22 %	
	0.0029	0.0027	0.0029	0.0027	0.0030	

8-9-80

26

[illegible] PROJECTIONS 1969-1973 STAR MET DATA

[illegible] AT THE SPECIFIED RECEPTORS

PARTICULATES

[illegible] PER [illegible] BIC METER

	RECEPTOR 1	RECEPTOR 2	RECEPTOR 3	RECEPTOR 4	RECEPTOR 5
[illegible]	0.55 %	0.55 %	0.55 %	0.55 %	0.54 %
[illegible]	0.2069	0.0066	0.0071	0.0068	0.0072
[illegible]	0.89 %	0.89 %	0.88 %	0.89 %	0.88 %
[illegible]	0.0111	0.0107	0.0115	0.0110	0.0116
[illegible]	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
[illegible]	0.	0.	0.	0.	0.
TOTAL	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %
	1.2519	1.2097	1.3002	1.2534	1.3284

SACC JUETTE MINE 1982 PROJECTIONS 1969-1973 STAR MET DATA

SOURCE CONTRIBUTIONS TO FIVE SELECTED RECEPTORS

ANNUAL PARTICULATES

MICROGRAMS PER CUBIC METER

SOURCE	RECEPTOR 1	RECEPTOR 5	RECEPTOR 6	RECEPTOR 7	RECEPTOR 8	
253	0.09 %	0.03 %	0.09 %	0.06 %	0.07 %	
	0.0011	0.0011	0.0011	0.0012	0.0012	
254	0.02 %	0.02 %	0.02 %	0.01 %	0.01 %	
	0.0002	0.0002	0.0002	0.0003	0.0003	
255	0.01 %	0.01 %	0.01 %	0.01 %	0.01 %	
	0.0002	0.0002	0.0002	0.0002	0.0002	
256	0.01 %	0.01 %	0.01 %	0.01 %	0.01 %	
	0.0001	0.0001	0.0001	0.0001	0.0001	
257	0.01 %	0.01 %	0.01 %	0.01 %	0.01 %	
	0.0002	0.0002	0.0002	0.0002	0.0002	
258	0.01 %	0.01 %	0.01 %	0.01 %	0.01 %	
	0.0001	0.0001	0.0001	0.0001	0.0001	
259	0.17 %	0.16 %	0.16 %	0.11 %	0.13 %	
	0.0021	0.0021	0.0021	0.0023	0.0022	FPL WILLOW
260	3.59 %	3.22 %	2.52 %	1.42 %	1.72 %	
	0.0449	0.0427	0.0336	0.0299	0.0307	FPL WILLOW
261	3.59 %	3.22 %	2.52 %	1.42 %	1.72 %	
	0.0449	0.0427	0.0336	0.0299	0.0307	MAN. ENERGY
262	0.03 %	0.03 %	0.03 %	0.02 %	0.02 %	
	0.0004	0.0004	0.0004	0.0004	0.0004	MAN ENERGY
263	0.15 %	0.15 %	0.13 %	0.09 %	0.11 %	
	0.0020	0.0020	0.0018	0.0019	0.0019	
264	5.29 %	5.34 %	12.49 %	5.48 %	2.66 %	
	0.0552	0.0775	0.1665	0.1365	0.0475	← MAN NEAR 387.4
265	8.61 %	10.75 %	9.93 %	23.99 %	8.40 %	
	0.1017	0.1423	0.1323	0.5049	0.1499	
266	4.23 %	6.24 %	4.44 %	23.88 %	34.54 %	
	0.0529	0.0833	0.0591	0.5027	0.6167	
267	0.15 %	0.34 %	0.17 %	0.42 %	0.83 %	BOILER MAX PT IS CLOSER TO 389.1 (SOURCE)
	0.0019	0.0045	0.0023	0.0088	0.0149	388.4
268	0.23 %	0.22 %	0.26 %	0.15 %	0.18 %	
	0.0029	0.0030	0.0034	0.0032	0.0032	
269	0.23 %	0.22 %	0.26 %	0.15 %	0.18 %	
	0.0029	0.0030	0.0034	0.0032	0.0032	
270	0.23 %	0.22 %	0.26 %	0.15 %	0.18 %	
	0.0028	0.0030	0.0034	0.0032	0.0032	
271	0.23 %	0.22 %	0.25 %	0.15 %	0.18 %	
	0.0028	0.0029	0.0034	0.0031	0.0032	
272	0.23 %	0.22 %	0.25 %	0.15 %	0.18 %	
	0.0028	0.0029	0.0034	0.0031	0.0032	
273	0.23 %	0.22 %	0.26 %	0.15 %	0.18 %	
	0.0029	0.0030	0.0034	0.0032	0.0032	

389.1 389.1
387.4 388.4
1.7 ⟷ .7

SICO QUETTE MINE 1982 PROJECTIONS 1954-1979 STAR NET DATA

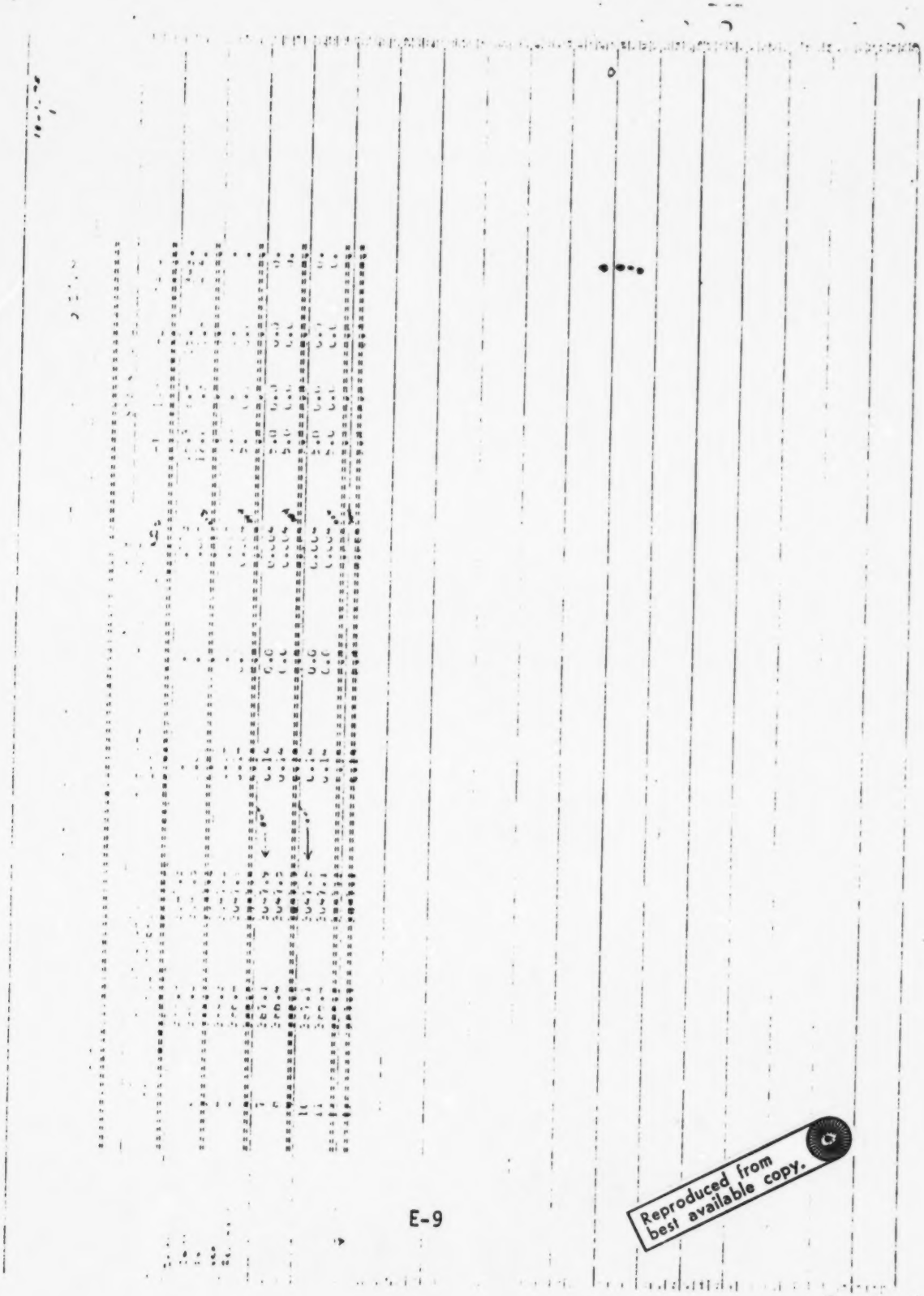
SOURCE CONTRIBUTIONS TO FIVE SELECTED RECEPTORS

ANNUAL PARTICULATES

MICROGRAMS PER CUBIC METER

SOURCE	RECEPTOR 1	RECEPTOR 5	RECEPTOR 6	RECEPTOR 7	RECEPTOR 9
274	0.55 %	0.54 %	0.63 %	0.36 %	0.43 %
	0.0069	0.0072	0.0094	0.0075	0.0077
275	0.89 %	0.83 %	1.02 %	0.58 %	0.69 %
	0.0111	0.0116	0.0136	0.0122	0.0124
BACK-GROUND	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
	0.	0.	0.	0.	0.
TOTAL	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %
	1.2519	1.3284	1.3329	2.1052	1.7861

```
JYR=74 IMO=12 JDAY=340.
ISTAB=  6    6    6    6    6    6    5    4    3    4    3    3    3    3    3    3    4    5    6    5    4    5    5    5
AWS=  2.1  2.1  2.1  2.6  3.1  2.1  2.6  3.1  3.6  5.1  5.1  4.6  4.6  4.1  4.6  4.1  4.1  3.1  2.6  4.1  5.7  4.6  4.1  4.1
TEMP= 284. 284. 284. 284. 284. 283. 283. 284. 288. 291. 294. 296. 298. 298. 298. 298. 296. 295. 293. 293. 292. 290. 290. 289.
AFV=  250. 260. 270. 260. 250. 250. 250. 250. 250. 260. 280. 270. 310. 300. 290. 300. 300. 270. 250. 270. 270. 260. 280. 280.
AFVR= 250. 264. 268. 258. 254. 248. 254. 246. 254. 256. 282. 274. 311. 303. 288. 298. 298. 271. 252. 274. 269. 263. 282. 276.
HLH1= 1362. 1405. 1448. 1490. 1533. 1576. 1619.  226.  508.  791. 1073. 1355.
      1637. 1919. 1919. 1919. 1919. 1915. 1907. 1899. 1890. 1882. 1874. 1866.
HLH2=  102.  102.  102.  102.  102.  102.  102.  316.  583.  851. 1118. 1385.
      1652. 1919. 1919. 1919. 1919. 1783. 1503. 1223. 1890.  662.  382.  102.

                                  M A X   H O U R L Y                                  M A X   2 4 - H O U R

      DAY       RATIO    CONCENTRATION  DIRECTION  DISTANCE(KM)  HOUR    CONCENTRATION  DIRECTION  DISTANCE(KM)
      340       7.320    3.338860E-05      31          0.50        13     4.561156E-06      30          0.50

JYR=74 IMO=12 JDAY=341.
ISTAB=  6    6    5    6    6    6    6    5    4    4    4    4    4    4    4    4    4    4    4    4    4    4    4    4
AWS=  2.6  3.1  3.6  2.6  2.1  2.6  2.1  3.1  4.6  5.1  6.7  7.7  7.7  7.2  3.6  4.1  5.7  5.1  3.6  4.6  4.1  4.1  5.1  4.6
TEMP= 289. 288. 288. 287. 285. 285. 285. 286. 290. 293. 295. 297. 299. 299. 299. 295. 294. 294. 293. 294. 294. 294. 293. 293.
AFV=  270. 280. 270. 260. 250. 270. 270. 280. 300. 310. 330. 320. 320. 350. 340. 360. 360. 360. 360.  10. 350. 360. 360. 360.
AFVR= 260. 280. 270. 256. 254. 270. 275. 280. 304. 307. 334. 316. 319. 354. 344.   2.   3.   1. 358.   6. 346. 359.   5. 357.
HLH1= 1858. 1849. 1841. 1833. 1825. 1817. 1808.  204.  462.  720.  977. 1235.
      1493. 1751. 1751. 1751. 1751. 1730. 1686. 1642. 1599. 1555. 1511. 1467.
HLH2=  102.  102.  102.  102.  102.  102.  102.  294.  537.  760. 1022. 1265.
      1508. 1751. 1751. 1751. 1751. 1730. 1686. 1642. 1599. 1555. 1511. 1467.

                                  M A X   H O U R L Y                                  M A X   2 4 - H O U R

      DAY       RATIO    CONCENTRATION  DIRECTION  DISTANCE(KM)  HOUR    CONCENTRATION  DIRECTION  DISTANCE(KM)
      341       3.789    3.314931E-05      36          0.50        22     8.749945E-06      36          0.50

JYR=74 IMO=12 JDAY=342.
ISTAB=  5    5    4    4    4    4    4    4    4    3    4    4    4    4    4    3    4    5    6    5    6    5    6    6
AWS=  3.1  3.1  4.6  4.1  2.6  1.5  2.1  4.1  5.1  4.6  5.1  5.1  6.2  5.1  5.1  4.6  6.2  3.6  2.1  2.1  1.5  1.5  1.0  1.0
TEMP= 291. 291. 291. 291. 291. 291. 291. 291. 291. 293. 293. 295. 295. 295. 294. 294. 292. 289. 286. 286. 286. 288. 285. 286.
AFV=  330. 320. 340. 320. 350.  50. 130. 170. 170. 180. 160. 160. 160. 100. 140. 150. 150. 170. 150. 160. 210. 230. 230. 230.
AFVR= 326. 318. 340. 319. 351.  53. 135. 171. 172. 181. 159. 156. 156. 105. 136. 147. 146. 166. 155. 162. 212. 230. 228. 233.
HLH1= 1424. 1380. 1336. 1292. 1249. 1205. 1161. 1117. 1074. 1030.  986.  942.
       899.  855.  855.  855.  855.  852.  846.  840.  834.  827.  821.  815.
HLH2=  913.  913. 1336. 1292. 1249. 1205. 1161. 1117. 1074. 1030.  986.  942.
       899.  855.  855.  855.  855.  832.  785.  737.  690.  643.  595.  548.

                                  M A X   H O U R L Y                                  M A X   2 4 - H O U R

      DAY       RATIO    CONCENTRATION  DIRECTION  DISTANCE(KM)  HOUR    CONCENTRATION  DIRECTION  DISTANCE(KM)
      342      11.266    3.435901E-05      35          0.70         5     3.049787E-06      16          0.50
```



E-9

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	[illegible]	[illegible]	[illegible]
WPD	[illegible]	[illegible]	[illegible]
EPD	[illegible]	[illegible]	[illegible]
NPD	[illegible]	[illegible]	[illegible]
SPD	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

Dryer	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Boiler	2	1.59	4.07	10.80	2.43	4.54		.0221	.0221
RR	3	[illegible]	3.44	7.45	[illegible]	[illegible]		.0217	.0217
Veh	4	[illegible]	[illegible]	4.62	[illegible]	[illegible]		.0143	.0143
Reclam.	5	7.05	0.42	0.41	0.41	[illegible]	.0228	.0228	
	6	[illegible]	[illegible]	1.13	[illegible]	[illegible]	.0344	.0344	
	7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.0010	[illegible]	
	8	17.00	[illegible]	[illegible]	[illegible]	[illegible]	.0277	[illegible]	
	9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.0478	.0478	
	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.0418	.0021	
	11	7.02	0.40	0.50	1.13	1.41	.0175	.0195	
	12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.0286	.0286	
	13	[illegible]	[illegible]	0.70	[illegible]	[illegible]	.0552	.0021	.2189
	BACK-	0.0	0.0	0.0	0.0	0.0			.7382
	TOTAL	100.0	100.0	100.0	100.0	100.0			
		WPB	EPB	NPB	SPB	E edge of reclam. area			

Input Boundary Adjustment Factor

$= \frac{.032}{.036} = .89$

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E-11

4.0 SUPPLEMENTAL ANALYSES

4.1 ADDITIONAL RADIOLOGICAL DATA

Introduction

Subsequent to publishing of the Draft Environmental Impact Statement in October 1979, additional radiological data regarding Estech's Duette Mine site have been developed. By an Agreement* entered into by Manatee County, State of Florida Department of Community Affairs, Sarasota County, and Estech General Chemicals Corporation, a data collection program was conducted to provide an expanded radiological data base for the proposed project site.

Purpose

The purpose of this evaluation is to determine if the findings and conclusions presented in the Draft Environmental Impact Statement (DEIS) and its attendant Radiological Environment Resource Document for Estech General Chemicals Corporation have been altered or modified as a result of supplemental radiological data unavailable at the time of the DEIS preparation. A comparison of the DEIS data base used to characterize the radiological profile of the mine site with the supplemental data is outlined herein.

Scope of Additional Studies

Twenty-seven cores were drilled on Estech's Duette Mine site at locations intended to ensure that the previous mineable matrix sections can be used to delineate the matrix composite zone in each new hole. The matrix was composited and core washed for

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* Agreement of the Parties, State of Florida Division of Administrative Hearings, Case No. 79-1994, Estech General Chemicals Corporation, formerly Swift Agricultural Chemicals Corporation, Petitioner vs. Manatee County, a political subdivision of the State of Florida, et al., Respondent, March 1980.

twenty-four of the drill holes to obtain the -150 mesh fraction (clay).

These fractions were analyzed for percent dry weight and radium-226 content. Three matrix composites were processed for four fractions; 1) -150 mesh (clay), 2) sand tailings, 3) pebble and 4) concentrate. Each of these fractions was analyzed for determination of percent by weight, percent BPL and radium-226. Sixty-six samples (twenty-four each of matrix and clay fractions plus three each of matrix, clay, sand, waste pebble, pebble product and concentrate fractions) were analyzed for concentrations of uranium, radium, thorium and potassium. The analysis results are presented in a report entitled "Analysis of Estech Core Samples for Natural Radioactive Content"*.

Comparison

A comparison of the DEIS data with the supplemental data is presented below:

DEIS	Additional Radiological data
1) Matrix reported as 8.6 pCi/g of Ra-226	Twenty-seven matrix samples yielded Ra-226 at 7.6 ± 2.5 pCi/g
2) Clay fraction of the martix reported as 4.2 pCi/g Ra-226	Twenty-seven clay fraction samples yielded Ra-226 at 6.6 ± 3.4 pCi/g
3) Pebble fraction of the matrix reported as 29 pCi/g Ra-226	Pebble fraction samples yielded Ra-226 at 30 ± 1 pCi/g
4) Concentrate fraction of the matrix reported as 24 pCi/g Ra-226	Concentrate fraction samples yielded Ra-226 at 21 ± 3 pCi/g
5) Sand tailings fraction reported as 1 pCi/g Ra-226	Sand tailing samples yielded Ra-226 at 0.5 ± 0.04 pCi/g
6) Matrix reported as being in secular equilibrium (Ra-226 approx. = U-238, pCi basis)	Twenty-seven samples yielded a matrix U/Ra ratio of 1.18 ± 0.33

* Cline, James E., and Hollcraft, Joanne. "Analysis of Estech Core Samples for Natural Radioactive Content," Science Applications, Inc., Rockville, Maryland. May, 1980.

7) Beneficiation process reported as not producing significant fractionation of U-238 or Ra-226 from equilibrium	Twenty-seven clay samples yielded a U/Ra ratio of 1.29 ± 0.34 Pebble samples yielded a U/Ra ratio of 1.07 ± 0.06 Concentrate samples yielded a U/Ra ratio of 1.20 ± 0.26 Tailings samples yielded a U/Ra ratio of 1.05 ± 1.20
8) Sand and clay mix (2.5:1) used for reclamation plan reported to yield a final concentration of 1.9 pCi/g Ra-226	Sand and clay samples calculate a 2.5:1 mix with a 2.2 pCi/g concentration of Ra-226
9) Very limited data for U/Th ratios indicated a value of between 30 and 180. Analysis to justify that Ra-226 (a Th daughter) would not be a potential hazard assumed a U/Th ratio of between one and two orders of magnitude (10 to 100)	Forty-two samples with both U and Th data yielded a U/Th ratio of 36 ± 47. A few very high values produced the high standard deviation.

Analysis of Statistical Difference Between Two Means

As a further analysis of data compatibility, a statistical comparison was performed using the Student's statistical test. The analysis-of-variance F test can also be used; however it is more general and is most often used to compare more than two means. Whenever there are only two means involved, as is the case here, the Student's statistical test will result in the identical conclusion.

Given a group of independent random samples of "n" measurements drawn from two populations, each of which possesses an observed mean, "$\bar{y}$" and an observed standard deviation, "σ", make inferences concerning the differences between the true means "μ", of the two populations. Let the subscript "1" represent the original DRI data and the subscript "2" represent the SAI data. Assume that both populations have a normal probability distribution. Thus, one can further assume that the variability

of the measurements in the two populations is the same and can be measured bv a common variance. The best estimator of that common variance is the pooled estimator "S":

$$S = \sqrt{\frac{(n_1 - 1)\sigma^2_1 + (n_2 - 1)\sigma^2_2}{d.\ f.}}$$

where d. f. is equal to the degrees of freedom and for the problem at hand is equal to $(n_1 + n_2 - 2)$.

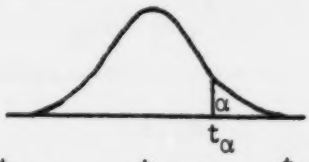
For small sample tests of the hypothesis H_0: $_1 - _2 = D_0$, where D_0 is the hypothesized difference between the means, it would seem reasonable to use the test statistic:

$$t = \frac{(\bar{y}_1 - \bar{y}_2) - D_0}{S\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

and the logical value for D_0 to test is zero. This test statistic will possess a Student's distribution when the stated assumptions are satisfied. In other words, the null hypothesis, H_0: $(\mu_1 - \mu_2) = D_0 = 0$, the hypothesis will be rejected when t is greater than $t_{\alpha/2}$ for the appropriate degree of freedom. This analysis will use $\alpha = 0.05$ or a 95% confidence level. See Table 4.1-A for the critical values of $t_{\alpha/2}$. Enter at an appropriate d. f. and consider the column entitled to $t_{0.025}$.

The calculations and results are shown on Table 4.1-B. The data have been arranged in order of best agreement with the hypothesis (pebble data) to that with the least agreement with the hypothesis (tailings data). The tailings data will cause a rejection of the hypothesis if the sigma of the data is used; however the counting error is the larger sigma in this case only and therefore controls. It therefore can be concluded, using the correct statistical jargon, that all data sets cannot be shown to not have identical true means.

Table 4.1-A Critical Values of t



d.f.	$t_{.100}$	$t_{.050}$	$t_{.025}$	$t_{.010}$	$t_{.005}$	d.f.
1	3.078	6.314	12.706	31.821	63.657	1
2	1.886	2.920	4.303	6.965	9.925	2
3	1.638	2.353	3.182	4.541	5.841	3
4	1.533	2.132	2.776	3.747	4.604	4
5	1.476	2.015	2.571	3.365	4.032	5
6	1.440	1.943	2.447	3.143	3.707	6
7	1.415	1.895	2.365	2.998	3.499	7
8	1.397	1.860	2.306	2.896	3.355	8
9	1.383	1.833	2.262	2.821	3.250	9
10	1.372	1.812	2.228	2.764	3.169	10
11	1.363	1.796	2.201	2.718	3.106	11
12	1.356	1.782	2.179	2.681	3.055	12
13	1.350	1.771	2.160	2.650	3.012	13
14	1.345	1.761	2.145	2.624	2.977	14
15	1.341	1.753	2.131	2.602	2.947	15
16	1.337	1.746	2.120	2.583	2.921	16
17	1.333	1.740	2.110	2.567	2.898	17
18	1.330	1.734	2.101	2.552	2.878	18
19	1.328	1.729	2.093	2.539	2.861	19
20	1.325	1.725	2.086	2.528	2.845	20
21	1.323	1.721	2.080	2.518	2.831	21
22	1.321	1.717	2.074	2.508	2.819	22
23	1.319	1.714	2.069	2.500	2.807	23
24	1.318	1.711	2.064	2.492	2.797	24
25	1.316	1.708	2.060	2.485	2.787	25
26	1.315	1.706	2.056	2.479	2.779	26
27	1.314	1.703	2.052	2.473	2.771	27
28	1.313	1.701	2.048	2.467	2.763	28
29	1.311	1.699	2.045	2.462	2.756	29
inf.	1.282	1.645	1.960	2.326	2.576	inf.

From: "Table of Percentage Points of the t-Distribution." Computed by Maxine Merrington, Biometrika, Vol. 32 (1941),p. 300. Reproduced by permission of Professor E. S. Pearson.

Table 4.1-B Statistical Calculations and Results

Item	$\bar{y}_1$	$\bar{y}_2$	σ_1	σ_2	n_1	n_2	d.f.	S	t	$t_{0.025}$	test
Pebble	29	30	2.5	1.0	4	3	5	2.03	0.65	2.57	Ok
Concentrate	24	21	3.0	3.0	4	3	5	3.00	1.31	2.57	Ok
Matrix	8.6	7.6	2.6	2.5	11	27	36	2.53	1.10	1.96	Ok
Clay	4.2	6.6	1.1	3.4	4	27	29	3.24	1.38	1.96	Ok
Equilibrium	1.06	1.18	.23	0.33	20	27	45	0.27	1.40	1.96	Ok
Tailings	1.0	0.5	0.3	0.28*	4	3	5	0.29	2.26	2.56	Ok

*Counting error larger than error on the mean

Conclusions

The addition of twenty-seven cores and three complete matrix fractionations did not provide radiological data which would alter the findings of the Draft EIS regarding the radiological profile of the site. A re-analysis of radiological impacts based on the additional data is not deemed necessary for the Final EIS.

4.2 ELEVATION OF SAND-CLAY DISPOSAL HEIGHT

Proposed Change

In the original proposed waste disposal plan, the crest height of the temporary dikes surrounding the sand-clay mix areas was planned to be 14 feet, with a maximum thickened clay-sand level of 9 feet. This design was based on two critical factors:

- The proportion of clay in the matrix was taken as 18 percent, based on available prospect data.
- The clay was assumed to reach a solids content of 30 percent after two years, based on limited laboratory settling tests.

More recent investigations have shown that both of these factors were unconservative. First, a re-analysis of the sample data has shown that the proportion of clay in the matrix is actually 24 percent rather than 18 percent. As a result, the mass of waste clay to be disposed is actually one-third more than originally had been thought.

Second, a more sophisticated technique for waste disposal analysis has been employed*. This analysis represents the state-of-the-art for analyzing and predicting the consolidation of phosphate waste clays. Based on the best available geotechnical data for the Duette Mine site, this analysis evaluated the mass of dry clay (mixed with sand) that could be contained in a disposal area.

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* Bromwell, L. G., and Carrier, W. D., III. "Consolidation of Fine-Grained Mining Wastes". Proceedings of the Sixth Pan-american Conference on Soil Mechanics and Foundation Engineering. Lima, Peru. 1979.

It was found that the clay will reach a solids content of only about 24 percent after two years in the mine cuts, rather than 30 percent.

Thus, the combination of an increase in the mass of the waste clay and a decrease in the anticipated solids content at the end of filling has resulted in an increase in the volume of clay of more than 50 percent.

Three alternatives were considered in evaluating the proposed increase in sand-clay storage volume: 1) no action; 2) extension of time period necessary for consolidation and final grading; and 3) Estech's proposed increase in the height of the sand-clay disposal areas.

The no action alternative would effectively preclude the mining operation due to the unavailability of storage area to accomodate the projected 50% increase in clay volume. The disposal and storage of mining waste on the applicant's property is an inherent responsibility of the operation. The effects of the no-mining alternative have been presented in the Alternatives Evaluation section and may be applicable to the no-action alternative of the sand-clay storage question.

In evaluating the remaining alternatives, the primary goal was to select the plan that achieved the final reclamation at the approximate original level with the least significant environmental perturbation. This goal can only be realized by either extending the time period necessary for consolidation and final grading or increasing the height of the sand-clay storage areas.

If the sand-clay disposal areas remain as originally proposed, time required for consolidation and reclamation of the sand-clay mixture estimated to be is extended by approximately 5 - 8 years. This additional required time would significantly alter the timely reclamation schedule and mining plans as presented for regulatory review in the Manatee County Master Mining Plan, State of Florida Development of Regional Impact Application and

the Draft Environmental Impact Statement. More importantly, several elements of the environmental considerations may be adversely affected by the extension of the reclamation schedule.

The elevation of the land surface by the sand-clay mixture for additional years will result in modified topographic contours and attendant watershed changes for a period of time, which could conceivably influence stream and river flow volumes. The extended modification of flow volumes may change the water quantities available to habitats dependent upon specific hydric conditions.

A redefinition of hydric periods within areas dependent on xeric conditions will result in the eventual demise of the vegetation as well as a modification of soil moisture required by various species of upland wildlife.

Perhaps most significantly would be the necessity of greatly increasing the clay settling area. In order to provide an area for the clay waste generated during the time required for the sand-clay mix to subside to a level which would allow for additional input, additional clay settling facilities would have to be constructed. This necessity alone appears sufficient reason for excluding this alternative from further consideration. Present EPA policy (Areawide EIS) as well as public opinion promote the elimination of conventional aboveground clay disposal areas.

The increased height will provide the additional storage volume required to contain the predicted volume of waste clay, and will also result in a higher ultimate solids content owing to higher average compressive stresses.

In order to maintain the original reclamation time schedule, Estech proposes to increase the height of sand-clay disposal areas and the surrounding temporary dikes. Based on the computer analyses described above, the crest height of the temporary dikes for the first ten years of mine life is now planned to be 23 feet, with a maximum filling level of 18 feet, so as to provide

5 feet of free board. The 480 acre initial settling area is to remain as originally proposed with a dike height of approximately 30 feet and fill to approximately 25 feet above grade.

It should be noted that these analyses are based on the best available data. However, geotechnical data will continue to be obtained even after mining begins, and the analyses will be updated and revised accordingly. Thus, it may be necessary to raise (or lower) the crest heights of the temporary dikes as mining proceeds. However, it is not expected that the actual crest heights will differ substantially from 23 feet above original ground.

Impact Analysis

In assessing the impacts of the proposed change, emphasis was directed to those elements of the modification which may affect impacts and/or conclusions presented in the Draft EIS. The primary focus of this analysis is to identify the resulting impact changes and the alternatives which may affect the decision-making process of NPDES permit application review.

Possible impacts of the proposed revisions were considered for various geotechnical topics addressed in the Draft EIS. Specific impacts were identified in the following areas:

- Reclamation Schedule
- Water Requirements
- Final Topography
- Permeability of Sand-Clay Mix
- Groundwater
- Reclaimed Land Radiological Characteristics
- Energy Requirements
- Reclaimed Land Use Potential
- Reclaimed Soil Types

The nature and magnitude of the identified impacts is discussed for each area in the following sections.

Reclamation Schedule - The allotment of five years to reclaim sand-clay disposal areas is not altered in the revised plan. However, the sequence of filling, consolidation and final grading

and revegetation have been revised. In the original plan, two years were allotted for filling of an area, two years for consolidation and one year for final grading and revegetation. The clays were projected to be at approximately 25 percent solids at the end of filling and at approximately 30 percent solids at the end of the consolidation period. The revised plan calls for stage filling of sand-clay disposal areas over a three-year period with one fill per year. The clays are projected to be at approximately 25 percent solids at the end of the third year. One year is allotted for consolidation of the landfill at the end of which the clays are projected to reach approximately 30 percent solids. The fifth year is allotted for final grading and revegetation. Therefore, both the original and revised plans project the clays in the mixture to be at approximately 30 percent solids at the end of the fourth year. The two plans differ in that the original plan allowed two years for the clays to consolidate from 25 percent to 30 percent solids, whereas the revised plan allows one year.

There are no field scale demonstrations upon which to base predictions of consolidation rates for sand-clay landfills. Therefore, the question of consolidation rates in sand-clay landfills is somewhat conjectural. However, the consolidation rates projected in the revised plan are within the limits defined by laboratory studies and mathematical modeling.

Water Requirements - The water balance prepared for the original plan provided for average groundwater and surface water withdrawals of 9,000 gallons per minute (GPM). These withdrawals, along with the water entrained in the ore, make up for the losses incurred in the mine water recirculation system. The primary loss in the recirculation system is 7,977 GPM lost due to entrainment to waste clays. The quantity of water entrained per ton of waste clays is not constant; it depends on the water release that occurs as the clays consolidate. Therefore, clay entrainment losses are not necessarily directly proportional to the amount of waste clays generated.

The clay entrainment losses of 7,977 GPM calculated in the water balance are based on achieving water recovery as the clays consolidate to 18 percent solids. This water recovery efficiency is typical of many operating mines. Additional water is released as the clays consolidate beyond 18 percent solids. However, the rate of water release and the amount of released water that can be recovered is difficult to determine since some of the released water is lost to evaporation, runoff and seepage. The sand-clay mix waste disposal technique proposed by Estech is projected to enhance water recovery efficiency and, therefore, reduce losses due to entrainment in clays.

The increase in proportion of clay in the matrix (from 18 to 25 percent) will result in an increase in water loss to clay entrainment. This will make more critical the effective recovery of water as the clays consolidate. In order for Estech to hold their clay entrainment losses to a level such that their groundwater and surface water withdrawals do not exceed the permitted 9,000 GPM, they must achieve effective water recovery as the clays consolidate to approximately 22 percent solids. Although there has not been sufficient field demonstration to assure that this recovery efficiency can be achieved with the sand-clay mix technique, such recovery is within the capabilities projected for the system. If, however, water recovery is only achieved up to 18 percent clay solids, it may be calculated that Estech will require an additional 2,100 GPM above their permitted groundwater and surface water withdrawals. The proposed increased height of the sand-clay disposal areas with the attendant increase in compressive stresses will enhance the water recovery efficiency to a greater degree than the originally proposed height.

Final Topography - The revised action proposed by Estech calls for filling sand-clay disposal areas to an average height of 18 feet above ground level instead of 9 feet proposed in the original plan. Both the original and revised plans project the clays to be at approximately 25 percent solids at the end of

the fill period. Both plans also call for reclamation to begin at the end of the fourth year when the clays are at approximately 30 percent solids. Approximate subsidence predictions can be made based on the volume of water that is released during consolidation. Based on these calculations, the nine-foot fill level proposed in the original plan would subside to 2.4 feet above natural ground level by the time reclamation begins. Due to the approximations inherent in the calculation of subsidence rates, this level was referred to as "approximately five feet" above ground level in the Draft EIS. For the revised plan, the approximate calculations indicate that the proposed 18 foot level will subside to 7.4 feet above ground level at the beginning of reclamation.

After reclamation is complete, subsidence is likely to continue over an extended period of time at an unknown rate. In the original plan, long-term subsidence from 30 percent to 35 percent clay solids may be calculated to bring the level to 2.1 feet below ground level. Again, due to the approximations inherent in the calculations, this level was referred to as "near natural grade" in the Draft EIS. For the revised plan, it may be calculated that subsidence to 35 percent clay solids will bring the sand-clay level to 0.2 feet above existing ground level.

Over an extremely long period of time, subsidence may continue as the clays consolidate beyond 35 percent solids. However, predictions beyond this point are strictly conjectural as there are no empirical data to support them.

In summary, according to approximations used in subsidence calculations, the revised plan will result in sand-clay levels that are a few feet above those proposed in the original plan. Long term subsidence to 35 percent clay solids is projected to bring the sand-clay levels to essentially natural ground level. Based on these results, the increased fill level for sand-clay mix should have no impact on the formation of shallow depressions near the outlet end of waste disposal areas. The formation of

these depressions is based on differential subsidence within the landfills which will not be altered by the proposed revision.

Permeability of Sand-Clay Mix - Since the percent clay solids in the sand-clay mix is the same for both the original and revised plans, the permeability coefficient for the mix has not changed. Published coefficients of permeability for phosphate clays indicate that the mixture should have coefficients of permeability of about 8×10^{-7} CM/Sec. at 30 percent solids and about 3×10^{-7} CM/Sec. at 35 percent solids*.

Groundwater - The increase of sand-clay fill heights is not expected to cause any changes in the quality of the water leaking from the disposal area from those projected in the Draft EIS due to the fact that the proposed disposal practices will not alter the sand-clay mix ratio of approximately 2.5 to 1. Likewise, the permeability of the sand-clay mix is not expected to change as a result of the proposed fill height increase. Changes anticipated are 1) thickness of the waste material and 2) the head drive moving water through them. It is believed that these changes will tend to counterbalance each other resulting in a slight increase in the leakage over what was estimated in the Draft EIS. This change is expected to be insignificant.

Should Estech be unable to attain effective water recovery as the clays consolidate to 22 percent, it has been calculated that an additional 2,100 GPM will be required above the permitted groundwater and surface water withdrawals. In order to obtain additional quantities of water for the project, Estech will be required to submit factual information to the Southwest Florida Water Management District delineating the sources and uses of this additional water and the impacts created as a result of them. The district board will then act on modifying the existing Consumptive Use Permit. It would be speculative to attempt to

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* Keshion, Berg, C. C. Ladd and R. E. Olson. "Sedimentation - Consolidation Behavior of Phosphatic Clays," Geotechnical Practice for Disposal of Solid Waste Materials, A.S.C.E. Specialty Conference, June 1977.

determine the need for additional water qualities until operational data is available specifying the water recovery efficiency at 22 percent consolidation.

Reclaimed Land Radiological Characteristics - According to the data presented in the Radiological Environment Resource Document of the Draft EIS, overburden from the site has an average radium -226 level of 1.5 pCi/g while the sand-clay mix has an average radium-226 level of 1.9 pCi/g. Therefore, the greater extent of overburden capping which results from the revised plan will serve to reduce the radium-226 content of reclaimed surface soils. The radium-226 levels for both overburden and sand-clay mix are relatively low and this impact is relatively minor.

Energy Requirements - The $0.30 per ton additional pumping cost calculated for the mine and beneficiation areas equates to approximately 7.5 kilowatt-hours additional electrical energy use requirement per ton of product. In addition, approximately 20 percent of the additional earthmoving cost may be attributed to increased fuel consumption. This equates to approximately $0.06 per ton additional fuel cost or, on an electrical energy equivalent basis, to about 1.5 kilowatt-hours additional energy cost in earthmoving. Therefore, Estech's revised plan will require a total of approximately 9.0 additional kilowatt-hours per ton of product over that required in the original plan.

Reclaimed Land Use Potential - Most of the land to be reclaimed for agricultural uses is to be used for improved pasture. Overburden has been shown to be an acceptable soil for this use. Therefore, the revised plan will have no impact on the planned agricultural uses of reclaimed land.

Areas to be reclaimed for environmental uses include the marshes created in sand-clay depressions and forested drainage swales that interconnect the reclaimed sand-clay landfills. As previously stated, the revised plan should have no impact on the sand-clay depressions. Overburden soils have been shown

to be an acceptable medium for tree growth. Therefore, there should be no impact on the plans to reforest the drainage swales.

Reclaimed Soil Types - Due to the projected agronomic superiority of sand-clay soils, the original plan provided for no capping of sand-clay soils with overburden beyond that which occurs in grading the dikes to approved slopes. Some capping inevitably occurs when the dikes are graded to approved slopes. Since the 23 foot dikes contain more material than the originally proposed 14 foot dikes, the revised plan will result in greater coverage of sand-clay soils with overburden.

In the original plan, the maximum extent of overburden capping can be approximated by assuming that all sand-clay dikes are exterior dikes and that the dike material above a 7:1 slope must be graded over the sand-clay landfill. Based on these assumptions, the original plan would result in the capping of approximately 21 percent of all sand-clay soils with overburden ranging from a few inches to five feet in depth. Using these same assumptions, the revised plan would result in the capping of approximately 37 percent of sand-clay soils with overburden ranging from a few inches to seven feet in depth.

Sand-clay soils are projected to be superior to overburden soils in terms of inherent fertility, plant nutrient retention properties and moisture retention properties. On the other hand, overburden soils should have better tillage properties than the sand-clay soils. In addition, overburden soils are agronomically equal or superior to native soils on the site due to their higher content of clay and available plant nutrients. Therefore, while capping of sand-clay soils is not ideal from the agronomic standpoint, the overburden soils will still be an acceptable medium for plant growth.

Conclusion

The proposed modification does not significantly alter 1) the ultimate consolidated sand-clay fill elevation, 2) subsidence

rate, 3) soil characteristics (permeability, leakance, etc.), 4) water balance and 5) marsh development. These elements have been identified as the controlling factors that would produce any effects different from those described in the Draft EIS. Therefore, the elevation of the sand-clay fill height to 18 feet will not constitute major changes in the impact analysis and conclusions presented in the Draft EIS.

5.0 PUBLIC PARTICIPATION

The Draft Environmental Impact Statement (DEIS) was published in October 1979 and made available to the Council on Environmental Quality and the public. A public notice appeared in the local newspapers. The Federal Register (Volume 44, No. 202) dated October 17, 1979 announced the availability of the DEIS and the proposed issuance of an NPDES Permit. The DEIS was provided to numerous Federal, State and local agencies as well as concerned individuals, interest groups and public officials.

A notice of the public hearing was promulgated October 5, 1979. The public hearing was held in Bradenton, Florida, November 28, 1979 and was attended by 82 participants. In addition to the public input afforded by the hearing (transcript provided herein), many letters were received and are included in this Final EIS.

The designations in the margins of the letters (W-1 thru W-130) identify those specific comments for which responses have been developed. These responses follow the letters. In a similar manner, the designations in the margins of the hearing transcript (T-1 thru T-65) identify those comments which have been responded to. The vast majority of the transcript comments were very similar, and in many cases identical to many of the written comments. Consequently, most of the transcript responses refer directly to responses previously presented.

5.1 WRITTEN COMMENTS AND RESPONSES TO WRITTEN COMMENTS

COUNTY OF SARASOTA

FLORIDA

BOARD OF COMMISSIONERS

ANDREW SANDEGREN • DISTRICT 1
BEVERLY CLAY • DISTRICT 2
JAMES D. NEVILLE • DISTRICT 3
JOHN M. SABA, JR. • DISTRICT 4
LARRY RHODES • DISTRICT 5
ED MARONEY • COUNTY ADMINISTRATOR

P.O. BOX 8
SARASOTA, FLA. 33578
PHONE: 813/365-1000

December 11, 1979

Mr. John E. Hagan, III
Chief EIS Branch
EPA Region IV
345 Courtland Street NE
Atlanta, Ga 30308

Re: Comments on the Draft EIS for the Estech General Chemicals Corp. Proposed Duette Mine, Manatee County, Florida

Dear Mr. Hagan:

On behalf of the Board of County Commissioners of Sarasota County, please find enclosed additional comments prepared by Mr. Russell P. Klier concerning the draft site-specific Environmental Impact Statement on the proposed Estech General Chemicals Corporation phosphate mine in Manatee County.

These additional comments focus on deficiences in the draft EIS concerning the proposed rock drying facility, and show that the proposed rock dryer would use more than twice as much energy to dry the phosphate rock at Estech's mine than would be expended by shipping the wet rock as far as the Far East. Permitting a rock dryer, which is fired by fuel oil, at the Estech mine site would therefore waste tremendous amounts of this nation's oil supplies in addition to creating a new source of air pollution. W-1

Accordingly, as with other aspects of the draft EIS previously commented upon by the County*, the economic justification for the rock dryer is inconsistent with the recommendations of the EPA Areawide Environmental Impact Statement. The primary justification in the draft EIS for permitting a rock dryer in Manatee County is that over the 20 year life of the mine it would deprive W-2

*A copy of the County's previous comments is enclosed for reference.

Estech of some potential customers who still require dry rock. The EIS alternatives assessment document, however, states on page 50:

> As obsolete smaller phosphoric acid plants are replaced with new facilities, it is certain that more wet rock processing will be incorporated and a gradual shift to this more desirable system will occur.

The draft EIS prepared by Conservation Consultants, Inc., seems more concerned with preserving the widest possible market for Estech and allowing it to cater to the most obsolete and inefficient chemical plants, rather than minimizing environmental damage to our area and seeking ways to bring the Estech project into conformity with the recommendations of the EPA Areawide Environmental Impact Statement.

Based upon the enclosed comments prepared by the County's professional staff, the Board of County Commissioners of Sarasota County believes that the draft EIS violates both the letter and the spirit of the National Environmental Policy Act and that, accordingly, it would be improper for the EPA to issue any permits to Estech based upon the draft EIS document.

Revision of the draft EIS, which is clearly necessary before the issuance of any permit by EPA, should await the outcome of pending appeals of the decision of the Board of County Commissioners of Manatee County to deny land use approval for the Estech project. The project, even if ultimately approved, may be substantially altered, and the EIS should then assess the project as it would actually exist. If the land use decision by Manatee County is upheld, further effort to revise the draft EIS would, of course, be unnecessary. W-3

Your attention to, and action upon, the enclosed comments will be appreciated by the Board of County Commissioners and the people of Sarasota County.

Very truly yours,

BOARD OF COUNTY COMMISSIONERS
OF SARASOTA COUNTY, FLORIDA

By: Larry Rhodes
Chairman

LR:jm
Enclosures

A Report Prepared for the Sarasota County

BOARD OF COUNTY COMMISSIONERS

on

ESTECH GENERAL CHEMICALS CORPORATION'S

PROPOSED ROCK DRYING FACILITY

Russell P. Klier, M.S.

December 10, 1979

The Environmental Impact Statement prepared for the Estech General Chemicals Corporation proposed Duette Mine, highlights the fact that the use of a rock dryer at this facility will use more energy and also cause more environmental damage than the alternative of shipping wet rock. In other words, it would worsen our local environment and worsen our national energy picture to allow a rock dryer at this facility.

The Areawide Environmental Impact Statement (AEIS) that was prepared by the federal government to protect our environment from the cumulative effect of the phosphate industry specifically recommended: "eliminate the rock-drying process at beneficiation plants and transport wet (6 to 20 percent moisture) rock to chemical plants." This phosphate mine is proposing to construct rock drying facilities at the mine site in direct conflict with the AEIS recommendation. The AEIS did allow for some exceptions, as it states on page 2.1: "A possible exception on a case-by-case basis could be made for rock to be shipped outside of FIorida for chemical processing; if the energy for transporting the moisture were greater than the energy saved by eliminating drying, drying at the beneficiation plant would be considered if air quality (including radiation) could be adequately protected." The reason that Conservation Consultants give for justifying the use of a rock dryer can be found in the Alternatives Evaluation document on page 49: "Ship Wet Rock - shipping wet rock to all customers may be technically feasible, but Swift would lose customers who cannot use wet rock." This EIS justifies a rock dryer not because of the energy consideration as required in the AEIS, but because of the marketing situation. W-4

This Environmental Impact Statement Alternatives Evaluation actually points out the conflicts between the AEIS and this facility; for instance, on page 52: "more energy in the form of fuel oil is consumed to dry the rock than is consumed to ship the additional water in the wet rock assuming the rock will not be dried at the final destination." This is further highlighted on page 54 where figure 12-2 (attached) shows that the energy consumed to ship the water in the rock to the Far East (10,000 miles) would be only 150,000 BTU per ton, while the energy consumed to dry the rock would be 425,000 BTU per ton. In other words, it would take more than twice as much energy to dry the rock than to ship it to the far side of the earth. This document also points out that all of the energy used to dry rock is "domestic energy"; thereby worsening our energy problems. On page 25 the environmental aspects of the different scenarios of transporting wet rock or dry rock are presented. The scenario of shipping wet rock is listed as the most environmentally sound, whereas the scenario of drying rock at the mine site and shipping it dry is the third worst of the four scenarios presented. W-5

The alternatives assessment document on the top of page 50 discusses the fact that "As obsolete smaller phosphoric acid plants are replaced with new facilities, it is certain that more wet rock processing will be incorporated and a gradual shift to this more desirable system will occur."

I suggest that since this project will span more than twenty years and more wet processing will "occur" in the future, the EPA should deny the use of a rock dryer at this facility and require Estech to ship wet rock.

RPK:rkt

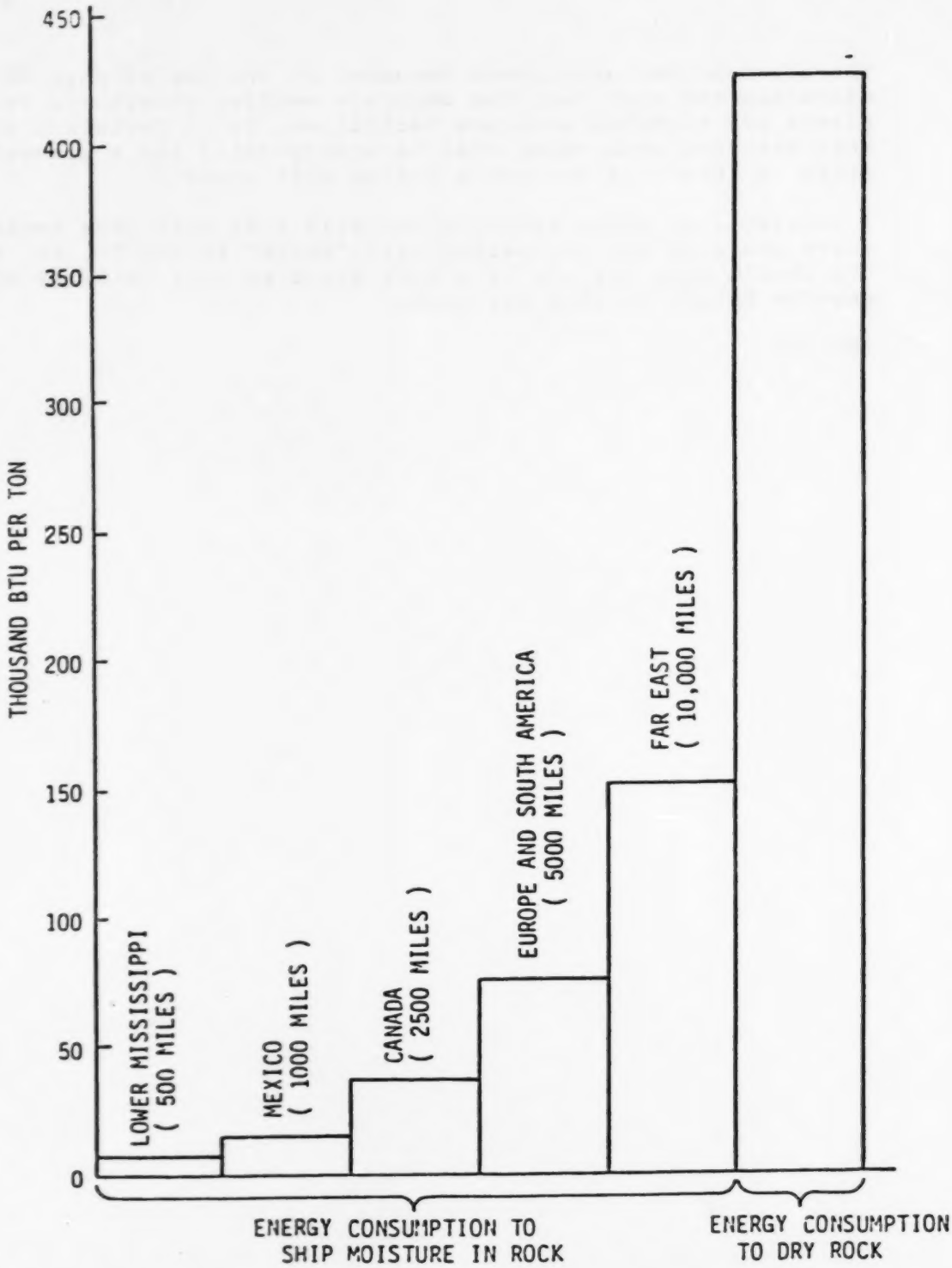

FIGURE 12-2 Energy Consumption.

Zellars-Williams, Inc.

A Report Prepared for the Sarasota County

BOARD OF COUNTY COMMISSIONERS

on

ESTECH'S (FORMERLY SWIFT'S) DRAFT ENVIRONMENTAL IMPACT STATEMENT - PROPOSED DUETTE PHOSPHATE MINE, BENEFICIATION PLANT AND ROCK DRYER

Prepared by

JEFFREY L. LINCER, *Ph.D.*

and

RUSSELL P. KLIER, *M.S.*

NOVEMBER 27, 1979

A Report Prepared for the Sarasota County

BOARD OF COUNTY COMMISSIONERS

on

ESTECH'S (FORMERLY SWIFT'S) DRAFT ENVIRONMENTAL IMPACT STATEMENT - PROPOSED DUETTE PHOSPHATE MINE, BENEFICIATION PLANT AND ROCK DRYER

Jeffrey L. Lincer, *Ph.D.*

Russell P. Klier, M.S.

November 27, 1979

CONTENTS OF THIS REPORT

Section	Page
Introduction	2
AIR POLLUTION Fuel Oil to be Used in the Rock Dryers Estimated Emission Rates from the Rock Drying Facility Predicted Ambient Air Quality in Relationship to Recent Changes Presentation of Air Quality Data in DEIS Cumulative Impact	3
SOIL, HYDROLOGY AND WATER QUALITY Holistic Approach Necessary Radical Changes in Water Quality	6
ABOVE-GROUND SLIME POND Contrary to Areawide EIS Contrary to Local Government's Desires Slime Pond Dam Failure Lack of Serious Discussion of Alternatives	7
WATER MANAGEMENT A Matter of Relativity Reduction of Available Potable Water A Need to Reassess the Proposed Water Management Plan	9
WETLAND PROTECTION Proposed Action In Opposition to EPA's Areawide EIS Recommendations Impact of Proposed Water Management	10
OTHER HABITAT LOST What Would be Lost Long-Term Impacts In Opposition to Local Policy	11
RARE AND ENDANGERED SPECIES Federal Recognition of the Values of Endangered Species Rare and Endangered Species On Site The Impact In Opposition to the Intent of Policy at All Levels Additional Endangered Species Shouldering the Responsibility	12
RECLAMATION	14
Conclusions	15
Recommendations	16
Literature Cited	17

INTRODUCTION

As indicated by EPA's notice of October 5, 1979, a Draft Environmental Impact Statement for the Estech General Chemical (formerly the Swift Agricultural Chemical) Duette Mine has been prepared pursuant to Section 102(2)(c) of the National Environmental Policy Act (NEPA) (P.L. 91-190) and applicable EPA Regulations at 40 CFR part 6.9. This report is the result of a review of that Draft Environmental Impact Statement (DEIS) and the resource documents associated with it.

AIR POLLUTION

Fuel Oil to be Used in the Rock Dryers. The ambient air quality analysis is based on the presumption that the fuel oil to be fired in the facility would contain "a maximum of 1.0% sulfur by weight" (page 20 of the Resource Document regarding Air Quality). We know from experience with the Florida Power and Light (FP&L) Manatee Plant that the 1.0% sulfur oil is not available on a regular basis. In fact, the federal government and the State of Florida have recently had to relax sulfur regulations because FP&L could not obtain sufficient quantities of 1.0% sulfur fuel oil. Currently, FP&L is allowed to burn 2.5% sulfur oil. It is, therefore, unrealistic to plan on this facility being able to burn 1.0% sulfur fuel oil. This is even further highlighted by the fact that we have historically received large quantities of low sulfur fuel oil from Iran, and now the Iranian supply has been cut off. Clearly, the air quality analysis should be reevaluated based upon a more realistic fuel oil of at least 2.5% sulfur oil. W-6

Estimated Emission Rates from the Rock Drying Facility. Not only was it estimated that low sulfur fuel oil would be fired in the facility, but it was also estimated that 96.5% of the resulting sulfur dioxide would be removed in the wet scrubbing system (page 35 of the Air Quality Resource Document). This 96.5% removal of sulfur dioxide is extremely high and overly optimistic, was poorly documented in the report, and is far in excess of what is considered "state of the art." According to a recent EPA review of sulfur dioxide removal in utility scrubbers in this country, 90% removal was the maximum that could be achieved on a reliable basis (Devitt et al., 1977). Most, in fact, do much more poorly. If this high removal estimate is to be used in calculating the emission rates, then Estech should be able to document it much better than it has. W-7

If the 96.5% removal cannot be achieved, then the actual SO_2 emissions will be higher than that predicted through the modeling. The same criticism can be applied to the NO_2 and particulate removal in the rock dryers, in that none of their removal efficiencies were well-documented in this Draft EIS.

Page 10 of the Resource Document, regarding Air Quality, discusses the methodology used to predict the sulfur dioxide concentrations after construction. It states that because the estimated sulfur dioxide emission rate would not be very great, a detailed modeling analysis of the sulfur dioxide concentration would probably not be warranted. Because of the above two points, a more detailed "major source" analysis of sulfur dioxide should be performed. Further (on page 77), the Resource Document for Air Quality indicates that the annual sulfur dioxide concentrations were computed by factoring the nitrogen oxide W-8 W-9

emission rates. This "shortcut" approach is not justified, considering the potential sulfur dioxide emissions, and because of these additional sources, the sulfur dioxide analysis should be done independently as a "major source.

Predicted Ambient Air Quality in Relationship to Recent Changes at The Florida Power & Light Manatee Plant. Ambient air quality monitoring was performed during the Spring of 1977 through the Summer of 1978 to identify the ambient air quality in the area for this DEIS. Future air quality predictions (i.e., after startup of this mine) were arrived at by computer modeling, based on emissions from this source and other future sources within a "sphere of influence" (as defined by the Environmental Protection Agency). W-10

The FP&L Manatee Plant was subject to a 1.0% sulfur fuel regulation during the time of ambient air monitoring for this project. However, because of a shortage of low sulfur oil, this plant was allowed to burn higher sulfur fuel (2.5%) during June of 1979. This resulted in an increase of 150% in the allowable sulfur dioxide (SO_2) emissions. This increase was not included in the computer model run for this analysis. In other words, the computer analysis took a baseline that was measured before the standard was relaxed, and then it did not input the increase in SO_2 which the plant would emit.

The Federal PSD Guidelines establish a minimum "significant criteria" of 1 and 5 ug/m^3 for annual and twenty-four-hour maximum SO_2 increases, respectively. Sarasota County recently ran a computer model for the FP&L Manatee Plant and found that the increase from 1.0 to 2.5% sulfur fuel would exceed this increment, thereby identifying the Manatee Plant as a "significant source," by definition. W-11

The DEIS states in many places (including page 72 of the main document and page 77 of the Air Quality Resource Document) that the SO_2 PSD and Ambient Air Quality Regulations would not be exceeded without "major source development" in the area. Clearly, an increase of 150% in the allowable fuel oil sulfur content for the two largest oil-fired boilers in the State of Florida would be a "major source development," and should, therefore, be included in the analysis. W-12

Since, not only the sulfur dioxide regulations but also the opacity and nitrogen dioxide regulations that apply to this plant were recently relaxed, these two parameters should also be more carefully considered in this DEIS. W-13

Presentation of Air Quality Data in Draft EIS. The Air Quality Documents were presented in a manner that made review of the actual computer input data very difficult. For example, the interactive sources that were actually inputed to the computer were not cross-referenced, the various computer runs were not indexed or properly identified, and the input codes used were inadequately explained. W-14

Cumulative Impact. Based upon the foregoing, the DEIS is technically inadequate and does not provide a valid basis for EPA action

pursuant to the Natinal Environmental Policy Act (NEPA) with respect to air quality impacts of the mining project.

Almost as if EPA's Areawide EIS (AEIS) on the Central Florida Phosphate Industry (EPA, 1978) had never been written, Estech has proposed a new rock dryer. The AEIS: (1) was predicated on the fact that there would be no additional rock dryers; and (2) clearly recommended (on page 2.1 of Volume I) the elimination of the rock-drying process at beneficiation plants. Manatee County has indicated its concern over additional air pollution by denying land use approval to the project including the rock-dryer. With the above two points in mind, the alternative of using an existing dryer at a remote location (page 20, DEIS) becomes a far more attractive way to handle the drying process. The apparent problems of using "older, less effectively controlled equipment located in areas marginal with respect to air quality standards" is, in fact, an opportunity for a double benefit. By choosing this alternative, the industry has the opportunity to retrofit these existing facilities with adequate environmental protection equipment (such as scrubbers), which would significantly decrease the existing air pollution in an area of marginal air quality.

The DEIS dismisses with little more than one sentence the recommendation of the Areawide EIS that any rock drying be performed at existing facilities. In light of the fact that Estech owns an existing rock dryer, the lack of vigorous analysis of this alternative greatly undercuts the credibility of the DEIS. It is incredible that the DEIS tries to justify a rock dryer in Manatee County on the grounds that Estech's existing rock dryer may be creating air quality problems in Polk County (DEIS, p. 20). The EPA must require good faith analysis of using existing rock drying facilities in accordance with the recommendation of the Areawide EIS and consider requiring upgrading of the existing rock dryer as a condition of granting any NPDES permit for new facilities. W-15

SOILS, HYDROLOGY AND WATER QUALITY

Holistic Approach Necessary. The sections of this DEIS relating to soils, hydrology, and water quality, should be reassessed using an holistic approach in an earnest attempt to clearly identify impacts that are unavoidable and/or without mitigation so that intelligent policy decisions can be made with respect to the desirability of trade-off options. As the text now stands, important data are subordinated under apparently unrelated sections, with little effort to indicate cause-and-effect relationships in a straightforward manner.

As indicated on pages 71 and 72 of the DEIS, the use of mined-out pits for storage areas for the waste clays and tailing sands will have an effect on the water quality in the shallow system but [the nature of these changes] will depend upon the nature of the materials placed in these pits.

According to the text (page 72), the lack of reliable data on the water quality of waste clays prevents projection of this impact. Although the text indicates that changes in the water quality within the surficial aquifer, as a result of the clay storage area, "should" be restricted to its immediate vicinity, the DEIS states that the actual differences between the water quality of various waste products and that of surficial deposits can only be characterized after the mine begins its operations. At that point, it will likely be too late. W-16

For 60 days during August and September of an average rainfall year, two million gallons per day (mgd) will be discharged from the mining, reclamation and plant site in the southeast portion of the property (through point 002 into the East Fork Manatee River). Effluent will also be discharged for 90 days during August, September and October of the average rainfall year to the North Fork from the clay settling area through point 003 at a rate of 1.8 mgd (DEIS, page 89).

Radical Changes in Water Quality. As indicated in the DEIS, there would be, at least, a doubling of radium-226 concentrations in surface waters; there would be up to a ten-fold increase in phosphorous concentrations and mass loadings in the North and East Forks of the Manatee River (as indicated on Tables 4.10 C & D of the DEIS); there would be as much as an 18-fold increase in fluoride; there would be a doubling of biological oxygen demand; there would be up to a five-fold increase in suspended solids; and there would be an increased contribution to these rivers of over 14,000 lbs. of total dissolved solids per day (even during minimal flow conditions).

In view of the above negative impacts, Manatee County has denied land use approval for this mine upstream from the region's most valuable potable water reservoir.

ABOVE-GROUND SLIME POND

Contrary to Areawide EIS. The Draft EIS proposes (on page 27) a 480-acre conventional above-ground slime pond. This slime pond will remain active throughout the entire mine life to receive clay wastes. By the end of the mine life, the area will be filled to about 25 feet above natural grade. This proposal is diametrically opposed to the recommendation of the Areawide EIS (page 2.1, line 1), which states "eliminate conventional above-ground slime disposal areas."

Contrary to Local Government's Desires. Both Sarasota and Manatee counties depend upon Lake Manatee for potable water. The very spatial relationship between the proposed above-ground slime pond and the downstream reservoir demands a reassessment of the sanity of allowing an above-ground slime disposal area. As indicated by Mr. Randall, Pollution Control Director for Manatee County, on February 15, 1979, at a public hearing on this proposed mine, "The best way to protect Manatee's most valuable asset (that is, its water) is to have a below-ground settling pond."

Slime Pond Dam Failure. The applicant has chosen to devote an entire section (starting on page 98) to the "hypothetical" failure of the clay settling area embankment. With an above-ground slime pond filled to 25 feet above ground level, and an earthen dam holding back literally billions of gallons of waste clays, spread out over almost 500 acres, and this condition being directly upstream from Manatee's most precious asset (its potable water source), it is not too difficult to determine why both the applicant and the local communities should be concerned about this unnecessary state of affairs.

As indicated on page 100 of the Draft EIS, should the dam fail, total suspended soilds would increase by 730 milligrams per liter and the additional sediment load over a two-month period would deposit up to 60 acre feet of this material in the reservoir. With expected increases in suspended clay particles, which determine to a great extent the amount of radium-226 in the water column, total radium-226 will exceed the State standard of 5 piC per liter for Class I-A waters upon entering Manatee's reservoir (DEIS, page 101). Based upon related environmental perturbations along the Apalachicola River (DEIS, page 101), the effect of the solids on the Manatee River floodplain will be to kill most trees and severely stress many of those that do survive. In addition, the spill would result in the destruction of aquatic fauna of the river with few, if any, organisms surviving. In addition, the spill would destroy the present littoral zone in the upper end of the reservoir, which, in turn, would significantly reduce the biological productivity of the reservoir.

Lack of Serious Discussion of Alternatives. Although it is apparently financially unattractive to the industry to comply with this AEIS recommendation relating to slime ponds, no alternatives to the conventional above-ground slime pond are even discussed. A conscientious attempt should be made to investigate and honestly discuss partially, or totally, incised slime ponds, thereby significantly decreasing the chances of an environmental disaster. W-18

Based on recent major dam failures, including that at FP&L's facility in the Okeechobee area, putting faith in a once-a-year inspection by a registered professional engineer, and his monthly review of reports by on-site operation personnel, is woefully inadequate considering the above projected impacts. Based upon the known impacts of above-ground slime ponds and the failure of the DEIS to analyze alternatives, an above-ground slime pond cannot be accepted by the EPA at this time as part of its proposed action.

WATER MANAGEMENT

A Matter of Relativity. As indicated on page 28 of the DEIS, 89% of the total water requirements will be recycled water. However, the apparently innocuous 11% makeup water required to offset system losses will average 16+ million gallons per day.

According to the DEIS, this differential is proposed to be supplied by groundwater pumpage until the fourth year, when surface diversions from the East Fork Manatee River supply approximately 3 mgd to the makeup requirements. How will this plan be affected when, for environmental reasons, the industry is not allowed to mine the East Fork Manatee River? Specifically, where will this 3 mgd come from? W-19

Reduction of Available Potable Water. During active mining, a total of 7.2 mgd reduction of stream flow will take place in the North and East Forks of the Manatee River. As indicated on page 80 of the DEIS, this reduction of flow would actually decrease the discharge into the Manatee Reservoir by approximately 9%. What seems to have been lost in the statistical manipulations presented in the DEIS is that the total flow of potable water, specifically from the North and East Forks of the Manatee, would be reduced by 33%.

A Need to Reassess the Proposed Water Management Plan. With the above almost 10% decrease in potable water reaching the Manatee Reservoir, a 33% reduction in potable water supplied by two major contributors to that reservoir, and the ecological impact of discharge reduction in the North and East Forks of the Manatee (see the section on Wetland Protection, which begins on the following page), the entire water management program needs to be revisited. W-20

WETLAND PROTECTION

Proposed Action. Section 2.3 (Resource Recovery Alternatives) proposes mining approximately 360 of the 600 acres of the freshwater marsh, 55 acres of the East Fork Manatee River, and most of the small feeder streams (DEIS, page 6).

In Opposition to EPA's Areawide EIS Recommendations. As stated (DEIS, page 180), "The segment of the East Fork Manatee River proposed for mining has been determined to be a Category 1 Wetland." Such wetlands provide important ecological functions, including erosion control protection and acting as a living filter by removing sediments and other pollutants from floodwaters. In addition, these wetlands are extremely productive and export a portion of this biological productivity to downstream areas. Based upon the recommendations of EPA's Areawide EIS relating to the protection of wetlands (pages 2.2 and 2.3), Category 1 should "be protected" and any mining in the East Fork would be contrary to the recommendations of the AEIS.

In addition, disturbing Category 2 and 3 Wetlands should be re-examined, when they are upstream from Category 1 Wetlands, and when that perturbation can be expected to affect the downstream Category 1 Wetlands. In addition, the biological, as well as the hydrological, input from these juxtaposed wetlands, is extremely important and should be addressed more completely. W-21

Impact of Proposed Water Management. Another very important consideration is the ecological impact of water flow reductions on the separate parts of the drainage system, which is glossed-over by grouping statistics. For example, the DEIS (page 80) indicates that a 5.4 mgd reduction in stream flow will occur in the East Fork. A comparison with existing statistics (on page 77 of the same document) reveals that this 5.4 mgd exceeds the average minimum flow during wet months, as well as the average mean and minimum flows for dry months (5, 3, and 0.8 mgd, respectively). W-22

With a vision of dried-up streambeds and the complete annihilation of fish, aquatic invertebrates and other wildlife totally dependent upon stream water for their existence, Estech's proposed water management program is unacceptable.

OTHER HABITAT LOST

What Would be Lost. As indicated on page 127 of the DEIS, the direct effect of mining will be the destruction of much of the present natural vegetation by land clearing and mining activities. The Long Leaf Pine/Zeric Oak Community will be eliminated on-site, while the Sand Pine Scrub Community, Long Leaf Pine/Zeric Oak Community, and Long Leaf Pine/Flatwoods Community will be partially eliminated (see DEIS, Table 4.12-a).

Long-Term Impacts. As indicated on page 127 of the DEIS, these impacts on habitat are largely long-term and irreversible. Unfortunately, there are no known instances of these upland communities naturally restablishing themselves and fully recovering when the soil has been radically disturbed. In that many of the dominent species, representing original vegetation like wire grass, have negligible reproductive potentials, recolonization by these species will be quite limited. In addition, since many of the natural upland vegetation communities are dependent upon fire for maintenance, and since fires will likely be excluded from these and adjacent areas, prolonged fire supression will constitute a long-term or even irreversible impact.

Perhaps the most devastating aspect of the proposed mining and reclamation plan on upland communities is their replacement by monocultures, like improved pasture. For instance, and as indicated in Table 4.12-a (DEIS), there will be an increase in improved pasture of almost 5000 acres (an increase of four-fold over that existing at the present time).

In Opposition to Local Policy. Since major changes in existing habitat are proposed and since these changes will adversely affect aquatic and other wildlife, including species considered of special concern, threatened or endangered, the proposed changes would also be in violation of the Manatee County Zoning Ordinance (paragraph 16, Section 9. "Violations," pages 108-4 and 5), which states, "no person or organization holding an operating permit under this ordinance shall pollute land or water, or damage aquatic or marine life, wildlife, birds, public or private property or allow any extraneous matter to enter or damage any mineral or freshwater-bearing formation."

Preserving 50 acres of sand pine scrub and an 18-acre cypress pond, while mining all around it, and devasting a major portion of the floodplain swamps, is not a reassuring committment to protecting important habitats. Clearly, the provision of a small stand of sand pine scrub and a few "tree plantings within pastures" (page 108 of Swift's DRI) cannot, even broadly, be interpreted as being adequate protection of habitats or the species they contain. W-23

RARE AND ENDANGERED SPECIES

Federal Recognition of the Values of Endangered Species. The federal government has recognized the importance of the medical, scientific and aesthetic values of endangered species and the need to protect the ecosystems upon which such species depend. In fact, EPA's Areawide EIS provides data which support extending P.L. 95-87 to phosphate mining to ensure that federally recognized endangered species will receive meaningful protection.

Rare and Endangered Species On Site. Sixteen species considered endangered, threatened, rare, or of special concern have been observed on or immediately adjacent to the Estech property (Draft EIS, page 136). Of these, three (pinweed, the eastern indigo snake, and the American alligator) are considered threatened on the federal list. Thirteen sighted on the property are recognized on the State list. One, the wood stork, is considered endangered, five are considered threatened (gopher tortoises, southeastern American kestrel, Florida scrub jay, Florida sandhill crane, and Sherman's fox squirrel), and seven are of special concern (common egret, Louisiana heron, black-crowned night heron, little blue heron, white ibis, burrowing owl, and caracara).

The Impact. At least two species (the southeastern kestrel and the sandhill crane) will have their preferred nesting habitat "substantially decreased by mining" (Swift DRI, page 109). The third species, the Florida scrub jay, "may be able to survive in one of the disturbed scrubs but, there will be little suitable habitat after mining" (DRI, page 111).

In Opposition to the Intent of Policy at All Levels of Government. The proposed mining will significantly destroy many existing wildlife habitats. In that the radical alteration of these habitats will specifically and greatly affect wildlife denizens of those habitats, the proposed alterations are in direct conflict with the intent of the federal Endangered Species Act and the equivalent State act. Closer to the geographical area under consideration, the proposed actions are in conflict with regional development policies--see especially Tampa Bay Regional Planning Council's "Future of the Region," 1979, which states, "wildlife and natural vegetation are recognized as important resources .... Special protective efforts regarding preservation of rare, endangered, or threatened species and habitat required to support these species in the region are encouraged."

Additional Endangered Species. As indicated by a recent seven-county study (by Layne, et al., 1977), other endangered or threatened species, like the Florida panther, Florida bear, Florida mouse, bald eagle, osprey, and others, may be present on this site. However, and

W-25 W-24

as admitted by the DEIS, the field techniques relating to these species may not have been extensive enough to reveal the presence of these other important species. W-26

Shouldering the Responsibility. This DEIS, like most others reviewed to date, simply lists the threatened or endangered species that will be affected, if not annihilated, and makes no serious effort to actually preserve these unique gene pools. The time is long overdue for the phosphate industry to justifiably shoulder the responsibility of accurately identifying the unique and endangered species present on a proposed site and, then, in appropriate detail, indicate how these species will be protected. W-27

RECLAMATION

In addition to the unacceptibility of mining and "reclaiming" a major secton of the Manatee River, there are foreseeable problems associated with the proposed reclamation program. For instance, the majority of the mined-out areas will be filled with a mixture of waste clays and sand tailings (DEIS, page 62). This method of reclamation may reduce the effectiveness of recharge wells by decreasing the permeability of the property and decrease bearing capacity of the new soil assemblage (relative to the natural soils) which would limit future land use options for the site. If land use is to remain rural in nature, this limitation may not be serious. However, should land use plans for the area change, then future developers might find it necessary to take extraordinary precautions in order to stabilize foundations or to take other measures that would increase the cost of development. W-28

CONCLUSIONS

The Draft EIS describes a number of installations and land uses which are in direct conflict with EPA's Areawide EIS. The most outstanding, of course, are the rock dryer, the above-ground slime pond, and the devastation of Class I and juxtaposed wetlands.

Not only is the proposed action by Estech contrary to the recommendations of the Areawide EIS (relative to above-ground slime ponds, rock dryers, and wetland protection), and to Manatee County's Zoning Ordinances, but it is also diametrically opposed to the region's growth policies, as stated in the Regional Planning Council's "Future of the Region," which was adopted July 1975 and amended April 1979.

What is particularly disconcerting about this DEIS is the overall orientation. That orientation is to justify exceptions to the recommendations of the Areawide EIS instead of identifying, describing, and analyzing mining methods which would comply with the recommendations of the Areawide EIS, especially those relating to rock dryers, above-ground slime ponds, and the protection of wetlands.

There is a consistent glossing-over of negative impacts and a reluctance to spotlight problems and tackle alternatives in a conscientious fashion.

EPA cannot, in good faith, accept this DEIS as an adequate extension of the Areawide EIS.

Unless EPA requires the third party consultant to revisit the above key issues that deviate significantly from the recommendations of the Areawide EIS, EPA will, in fact, be abandoning the Areawide EIS, which cost the taxpayers in excess of one million dollars.

EPA cannot take the action proposed on page 180 of the DEIS because that action is based upon a site-specific EIS which does not conscientiously attempt to identify, describe and analyze mining methods which would eliminate above-ground slime ponds, not require the proposed rock dryer, and protect wetlands and endangered species, which are vital and outstanding local and national resources.

RECOMMENDATIONS

1. That no furtner agency action be taken until the DEIS is refocused so that EPA can make an intelligent decision, as required by NEPA, based upon a conscientious analysis of environmental impacts identified by this report, that have been glossed-over in the DEIS.

2. That no federal permit be issued because it cannot be justified in the absence of local approval of the proposed Estech mining.

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Devitt, T., R. Gerstle, L. Gibbs, F. Hartman, R. Klier, and B. Kaseke. 1977. Flue Gas Desulfurization Systems Capabilities for Coal-Fired Steam Generators. EPA Contract No. 68-02-2603 Task #1.

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Tampa Bay Regional Planning Council. 1979. Future of the Region: A Development Statement for the Tampa Bay Region.

BACK COVER

OF

LINCER, KLIER REPORT

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH
P. O. Box 3000 • Boulder, Colorado 80307
Telephone: (303) 494-5151 • TWX: 910-940-3245 • Telex: 45 694 • FTS: 322-5151

November 28, 1979

Director, Region IV
U.S. Environmental Protection Agency
345 Courtland Street, N.E.
Atlanta, GA 30308

Dear Sir:

I have reviewed the Draft Environmental Impact Statement of the Estech General Chemicals Corporation, Report EPA 904/9-79-044G, October 1979, entitled Radiological Environment. This report was sent to me by Ms. Gloria Rains of Palmetto, Florida who invited my comments. In my opinion the assessment of risks is inadequate and I seriously doubt that EPA's proposed standards for public exposure to contaminants from the phosphate fertilizer industry are adequately conservative. My comments on this DEIS are enclosed.

Sincerely yours,

Edward A. Martell

Enclosure

cc: EPA Office of Radiation Programs
W.E. Bolch
Gloria C. Rains

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NATIONAL CENTER FOR ATMOSPHERIC RESEARCH
P. O. Box 3000 • Boulder, Colorado 80307
Telephone: (303) 494-5151 • TWX: 910-940-3245 • Telex: 45 694 • FTS: 322-5151

November 28, 1979

TO: Director, Region IV
U.S. Environmental Protection Agency
Atlanta, Georgia

FROM: Dr. Edward A. Martell
National Center for Atmospheric Research*
Boulder, Colorado

SUBJECT: Comments on DEIS, Radiological Environment, EPA904/9-79-044G, October, 1979

I have reviewed subject report of the Estech General Chemicals Corporation, prepared by Dr. W.E. Bolch. The author is to be commended for a report which treats many aspects of the problem of radioactive contamination from phosphate fertilizer production in a highly competent and professional manner. However this report gives no adequate consideration to two serious problem areas: (a) ground water contamination from soluble uranium radioisotopes and other radioelements, and (b) the nature and magnitude of risks attributable to 0.02WL of radon progeny in structures built on reclaimed lands. The EPA has proposed 0.02WL as the acceptable limit for public exposure to radon progeny in homes and other structures built on lands contaminated by the phosphate fertilizer industry. It is therefore incumbent on the EPA to assess the magnitude of the chronic health risks from 0.02WL and to determine whether or not such risks are acceptable to an informed public. The same questions apply to current standards for radioisotopes in drinking water: 5 picocuries per liter for radium-226, and 10 picocuries per liter for soluble uranium (recently proposed, see below). What is the expected incidence of leukemia, bone cancer, liver cancer and other effects from lifetime exposure to these levels of alpha emitting radioisotopes in drinking water?

My specific comments and questions on subject report are as follows:

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*Affiliation given for address purposes only. The National Center for Atmospheric Research is sponsored by the National Science Foundation.

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1. Top of page 57: It is assumed that ore processing does not modify uranium-radium equilibrium. Such an assumption is highly questionable and unjustified. Radium-226 is similar to calcium in its chemical properties and may be highly fractionated in by product gypsum, in triple phosphate, and in wastes and waste water fractions. In particular one should look at the distribution of soluble uranium in the waste water and in contaminated ground waters of reclaimed Florida phosphate land areas. Only recently, the contamination of ground waters by soluble uranium from uranium mines and uranium mills has been recognized as a potentially serious problem in Colorado and other uranium mining areas. W-29

2. Bottom of page 67: For completeness U-238 and Pb-210 should be added to this list. Both are bone seekers and the U-238 as well as the Po-210 daughter of ^{210}Pb emit alpha radiation and contribute to the risk of bone cancer and leukemia. The concentration of these isotopes should be assessed in drinking water, in cereal grains and other vegetable foods, and in dairy products of reclaimed phosphate lands. These two isotopes also should be included in the list of radionuclides measured in airborne dust particles generated by phosphate fertilizer production. W-30 W-31 W-32

3. Page 77, Par. 6: Here again it is "assumed" that the uranium is present in equilibrium with radium in the phosphate fertilizer product. However, Spalding and Sackett (Science, Vol 175, 629-631, 1972) showed that uranium is readily leached from phosphate fertilizers by water. Thus, high concentrations of uranium isotopes are to be expected in waste waters and ground waters in and downstream of phosphate production sites and in wells and streams throughout reclaimed phosphate lands. W-33

4. Page 78, third paragraph: It is stated here that "Community water systems shall not exceed 15 pCi/l of gross alpha (including radium-226 but excluding radon and uranium). The combined radium-226 and radium-228 shall not exceed 5 pCi/l."

The lack of a soluble uranium standard for water quality here is a very serious omission. Recently Dr. Wm. L. Lappenbusch (EPA Office of Radiation Programs, Criteria and Standards Division) has proposed a water standard of 10 pCi/l for soluble uranium radionuclides (mainly U-238 and U-234). And I must comment that based on current knowledge, this is not necessarily a conservative standard. Based on studies by Dr. Miriam P. Finkel of Argonne National Laboratory, the bone tumor risk for uranium and radium are very nearly the same per unit of alpha activity in bone. Uranium also gives rise to cancer in the kidney. The bone uptake and retention of uranium is very much higher in young children than in adults. The relative risk for uranium and radium should take into account both the relative uptake and retention on a cumulative basis for chronic exposure. The distribution in bone also may be very important. Per unit activity, Pu-239, which is highly non-uniform in bone, gives rise to a 10 times higher bone tumor risk than Ra-226. For chronic exposure, is the uranium distribution in human bone similar to that of Ra-226 or to that of Pu-239? The risk may be expected to vary accordingly. W-34 W-35

The need for a drinking water standard for Pb-210, which is a bone seeking radionuclide with a Po-210 granddaughter which emits alpha radiation, also should be determined. W-36

Radon in the water supply is an added source of indoor radon progeny for all residents in the affected areas (see comment 5).

5. Page 72, lines 7-10: The EPA proposed standard cited here, 0.020WL total exposure to radon progeny, including background, represents a substantial risk that may not be acceptable for public exposure when its full cancer risk implications are understood by the general public. Lifetime exposure to 0.02WL will give rise to about 3,000 excess lung cancer deaths per 100,000 people (EPA Report, Indoor Radiation Exposure due to Radium-226 in Florida Phosphate Lands, EPA 520/4-78-013, February 1979). In addition, it is now evident that this level also may contribute to a large increase in skin cancer risks (Sevcova et al, Health Physics 35, 803-806). I estimate that lifetime exposure to 0.02WL in homes and other structures may give rise to about 10 times higher than normal incidence of skin cancer. W-37

MANASOTA - 88

A Project for Environmental Quality 1968 - 1988

I am Gloria C. Rains of 5314 Bay State Rd, Palmetto, here as a member of the Izaak Walton League and as Chairman of Manasota-88.

Some of our members find this hearing at a time when the Estech application to mine phosphate in Manatee County has been denied by our local government and when the matter is under litigation, incongruous and an event that could be misconstrued by some as an attempt by the federal government to usurp the power of local government. Certainly, if the county's decision to deny this firm's application is upheld, as we have every hope it will be, this hearing is unnecessary.

We are opposed to the permitting of this Estech facility for the following reasons:

The quantity of uranium oxides mixed with phosphate rock exceeds the quantity extracted by the domestic uranium industry. These radioactive substances are redistributed and concentrated during mining. No small matter when you realize after mining that 48% of total radioactivity remains with the slime ponds and liquified clay and 12% remains in the waste sand tailings.

Therefore, I would like to bring to your attention some most serious comments re: the separate document entitled Radiological Environment, EPA 904/9-79-044G dated October 1979.

In this document you will find reference to an article in Science Magazine and a reference to Spalding. It appears these references are incorrect in text. Therefore, it appears the assumptions through this document may be incorrect. W-38

Due to weather problems and a holiday, information I hoped to present you from Dr. Edward A. Martell, National Center for Atmospheric Research, Boulder, Colorado will be mailed by Dr. Martell to both the Atlanta office and to the National Administrator.

However, Dr. Martell has provided the following information re: "possible ground water contamination from uranium contamination in the reclaimed land areas and on the magnitude of risks due to radon progeny in structures located on reclaimed lands."

Dr. Martell finds on the top of p. 57, referenced volume, "it is assumed that ore processing does not change the uranium to radium equilibrium. This assumption is unjustified and highly questionable. R-226 is similar to calcium in its chemical properties and is highly fractionated in phosphate wastes and waste water (also in byproduct gypsum & triple phosphate)." W-39

"In particular one should look at the distribution of soluble uranium in the waste water and in contaminated ground water of reclaimed Florida phosphate land areas. Only recently the contamination of ground water by soluble uranium from uranium mines and uranium mills has been recognized as a potentially serious problem in Colorado and other uranium mining areas."

Re: to the bottom of p. 67, Dr. Martell states, "for completeness U-238 & Pb-210 should be added to this list. Both are bone seekers and the U-238 as well as the Po-210 daughter of Pb-210 emit alpha radiation and contribute to the risk of bone cancer and lukemia. The concentration of these isotopes should be assessed in drinking water and in cereal grains, other vegetable foods and dairy products in and near reclaimed phosphate lands. These 2 isotopes also should be included in the list of radionuclides measured in dust particles." W-40

Re: page 77, para. 6, "here again it is "assured" that the uranium is present in equilibrium with radium in the phosphate fertilizer product. However, Spalding & Sackett (Science, Vol. 175, 629-631, 1972) showed that uranium is readily leached from phosphate fertilizers by water. Thus light concentrations of uranium isotopes are to be expected in waste waters and ground waters in and downstream of phosphate production sites and in wells and streams through reclaimed lands." W-41

Re: p. 78, para. 3: "It is stated here that "Community water systems shall not exceed 15 pCi/l of gross alpha (including radium-226 but excluding radon and uranium). The combined radium-226 and radium-228 shall not exceed 5 pCi/l."

"The lack of a soluble uranium standard for water quality here is a very serious omission. Recently, Dr. W.L. Lappenbusch, EPA Office of Radiation Programs, Criteria & Stds. Div., has proposed a water standard of 10 pCi/l for soluble uranium radionuclides (mainly U-238 & U-234)." And Dr. Martell feels he "must comment that, based on current knowledge, this is not necessarily a conservative standard. Based on studies by Dr. Miriam P. Finkel, Argonne Natl. Laboratory, bone tumor risk for uranium & radium are very nearly the same per unit of alpha activity in bone. Uranium also gives rise to cancer in the kidney. The bone uptake and retention of uranium is very much higher in young children than adults. The relative risks for uranium and radium should take into account both the relative uptake and retention on a cumulative basis for chronic exposure. The distributions in bone also may be very important." W-42 W-43

"Per unit activity, Pu-239, which is highly non-uniform in bone, gives rise to a 10 times higher bone tumor risk than R-226. Chronic exposure is the uranium distribution in human bone similar to that of R-226 or to that of Pu-239. The risk may be expected to vary accordingly. The need for a drinking water standard for Pb-210, which is a bone-seeking radionuclide with a Po-210 grandaughter which emits alpha radiation should also be considered." W-44

Radon in the water supply is an added source of indoor radon progeny for all residents in the affected areas."

Re: P. 72, lines 7-10: "The EPA proposed standards cited here, 0.020 WL total exposure to radon progeny, including background, represents a substantial risk that may not be acceptable for public exposure

when its full cancer risks are known by the general public. Lifetime exposure to 0.020 WL will give rise to about 3,000 excess lung cancer deaths per 100,000 people. Actually, EPA concedes this could be as high as 5,000 excess lung cancer deaths per 100,000. (EPA Report, Indoor Radiation Exposure due to R-226 in Fl. Phosphate Lands, EPA 520/4-78-013, Feb "79, revised July "79). In addition, it is now evident that this level will also give rise to a large increase in skin cancer risks (Sevcova et al, Health Physics, 35, 803-806)." Dr. Martell estimates that life-time exposure to 0.020 WL in houses and other structures will result in about 10 times higher than the normal incidence of skin cancer." W-45

Additionally, one rock dryer emits 64.5 tons per year of particulates and 2,450,000,000 picocuries of R-226, an amount which exceeds the equivalent radionuclides which would be allowed by the NRC from a 1000 megawatt nuclear power plant. The 2 dryers proposed at this plant will emit 1290 tons of particulates and 4,900,000,000 picocuries of R-226. These emissions can be somewhat controlled, but not eliminated through scrubbers. W-46

However, scrubbers have a high rate of failure and are only as good as their maintenance. High stacks to aid dispersal of these radioactive residual particulates and pollutant gases over the county is hardly a satisfactory resolution of this problem. Further, disposal of radioactive residue from these scrubbers pose another problem.

Despite scrubbers and stack dispersal, there can be no question that significant and dangerous to human health levels of radionuclides and particulates will continue to be emitted into our county air.

There can be no doubt how dangerous this mining operation will be to human health. However, other studies, including those presented at a U.S. Dept. Of Energy meeting on March 20, 1979 show that experiments indicate the effect of multiple low-level doses of radiation may be greater than that of one equivalent dose - that the cumulative effects of low-level radiation exposure may be much more harmful than has been believed.

Based on the latter, there can be no justification for the permitting of these rock dryers or for that matter mining as it is presently done.

Particulates from routine mining operations, transport of the rock and loading operations also create problems. Among other things, they cause obstructive pulmonary changes and alpha particulates, thought to remain in the lungs for years, also can cause death before cancer becomes evident.

As far as reclamation, the EIS says it will be too expensive for Estech to follow EPA recommendations for land cover of 3 to 4 ft. of topsoil. Actually, to date, there is no way to guarantee, either through home design or 3 to 4 feet of"relatively" radiation free earth cover, freedom from adverse health effects while living on reclaimed lands.

There can be no doubt radioactive soil in reclaimed phosphate mining lands is a serious problem - so serious that overburden, waste sands &

clay used for fill have been proposed for classification as "special" hazardous waste.

Additional information re: radiation danger for residents of homes on phoshate lands comes from Mr. W.A. Mills, head of EPA's Radiation Program, who stated the phosphate danger might be greater than the cancer risk for soldiers who participated in a variety of atomic bomb tests in Utah and Nevada during the 50's.

It is doubtful reclaimed lands can be safely used for housing -

It is doubtful they can safely be used for cattle or crop production either.

The EPA Phosphate EIS and other sources state consumption of foods (crop foods or beef) produced on reclaimed lands provide a route for secondary radiation impact exposures.

Gross alpha radioactivity in vegetables grown on reclaimed lands has been found to be higher than in vegetables grown outside the reclaimed regions. High levels of radioactivity have been found in wild game on reclaimed land, the latter producing a warning as to how much game could be safely consumed by humans from the Director of the Health & Rehabilitative Services. And as Dr. Martell has pointed out tests for other radioactive substances need to be done in these areas.

Approximately 340 acres of lands will be reclaimed as lakes if this application is approved. It is most questionable that these increasing numbers of phosphate pits filled with water have recreational potential until definitive tests by someone outside the industry re: the uptake of radioactive materials by fish and other wildlife are accomplished and prove that these areas can be safely used for fish management or recreational use. W-47

If this mining is permitted, we may experience a permanent decrease in agricultural lands which will impact unfavorably on our balance of trade. In fact, as radiological studies are made known, it may well be that phosphate mining constitutes a permanent use of the land. W-48

Restoration of wetlands on this site is impossible because of changes in adjacent land terrain, alteration of the local hydrologic regime and changes in the particular constituents of the water.

To date, the creation of wetlands has neven been successfully demonstrated. W-49

Marsh-type reclamation projects will not replace the natural functions of the true marsh.

Mining as it is proposed here, will destroy native vegetation, natural watersheds and the natural order of the soil's layers from top to bottom of the mined-out zone. Topsoils will be obliterated, breaking up the water-holding hard pan underlying most of the property and

will so change soil profiles and land contours as to irrevocably alter surface drainage patterns. Reclamation cannot restore these systems. W-50.

We ask that the Technical Staff of EPA's Air Quality Section check the EIS Air Quality report for sufficiency and accuracy which we understand has not been done. We base this request on information obtained from the DER/Agrico vs. Freeport Sulphur/Sulphur Terminals Inc. Administrative Hearing where this same preparer was used and where extremely serious omissions of data were found. (See attached information). W-51

We need to know if all emissions that could reasonably be anticipated and all the proposed emission points, including the most significant ones, were included for consideration in this EIS. W-52

There appears to be some question that the concentrations predicted by the Air Quality Display Model are reliable because of the nature of the emission estimates on which they were predicated. We quote p. 42 of the EIS which says, "It is recognized that the utility of this estimation is highly dependent on the estimate of background concentrations." "However, consideration of available facts will suggest etc etc." W-53

It should also be mentioned that cumulative effects of all mining operations presently permitted in our region plus Estech do not appear to have been considered. Additionally, the impact of the support activity, electricity generation - in this case, the daily generation of 73,955 KVA to supply this facility, which will produce further deterioration of air quality, does not appear to have been considered. W-54 W-55

What is listed as the hypothetical failure of the clay settling area embankment, more commonly referred to as a slime pond break, is not so unlikely, as we know from the recent FPL dam break.

It appears the effect of such a spill on our reservoir as described in the EIS may be understated and based on assumptions with which we disagree. A number of rather important facts are not discussed, such as how much it will cost to return the reservoir to operating condition. W-56

Predicating the short-term effects of this hypothetical spill on the "instant mixing of the 1000 acre feet of clear water discharge from the clay settling area with the minimum of 6,920 acre feet of reservoir storage does not appear realistic. W-57

Careful reading will show the water flow into the reservoir will be reduced because of waste clay damming the stream involved. This will mean a reduction of 9 to 12 mgd of water flow to the reservoir, leaving the slime to ooze in

The EIS is correct in stating all life will be severely stressed in the Manatee River floodplain, that most trees and all vegetation will be destroyed, that the aquatic fauna will be destroyed, all benthic organisms will be destroyed and species diversity obviously lowered.

the transfer point between the inclined conveyor belt and the elevated conveyor belt and for various places above and around the storage pile. No water sprays have been planned for spraying into the ships' holds. To catch sulphur dust, U-shaped concrete beds are planned for underneath all of the conveyor belts and the head pulleys of all conveyors are to be equipped with scrapers.

In support of its application, Agrico caused estimates of sulphur dust emissions from the proposed facility to be made. The only emissions considered, however, were those to be anticipated as a result of sulphur falling from the elevated conveyor belt onto the stockpile, wind erosion of the stockpile, vehicular traffic around the stockpile and scooping from the stockpile by front end loaders. The great bulk of the emissions reasonably to be anticipated and a substantial majority of the proposed emission points, including the most significant emission points, were omitted from consideration. These omissions went unnoticed by the DER personnel who recommended issuance of a construction permit to Agrico.

Material referenced by Comment W-51

In preparing emission estimates for submission to DER, it was assumed that prilled sulphur would have an emission factor comparable to the emission factor for aggregate. Subsequently, other experts assumed prilled sulphur would have an emission factor like coal's. Making such assumptions is acceptable methodology in the absence of information about a particular material but the possibilities for substantial error are significant.

Dusting properties vary even among different types of sulphur prills, depending on, among other things, their friability, method of manufacture, moisture content, and the distribution of particle sizes. Water formed or "wet" prills are produced by introducing drops of molten sulphur into a stream of water or a "quench tank"; air formed or "dry" prilling techniques use air to cool drops of molten sulphur, transforming

However, considerable evidence exists to assume expensive installation of new drying beds and probably new lagoon facilities and other new equipment will be necessary if this reservoir could ever operate again. The speed which with the EIS says this area is supposed to be revegetated again is questioned. Further, based on the conclusion of TBRPC 208 consultant, it is doubtful the reservoir could ever be used again for a potable water source. If it were possible, the expense in rendering it operable would be catastrophic. W-58

EIS projections re: radioactive levels, total suspended solids etc. after the spill appear quite optimistic. We ask EPA thoroughly examine these projections and the basis for them. W-59

As fas as probabilities of a dam break are concerned, we are talking about our public-drinking water supply upon which the overwhelming number of people in Manatee County and many in Sarasota County rely. It will take only one spill to put us out of business.

While the EIS sees recharge for our groundwater aquifer as posing no problem, accumulated information shows injection through connector wells of surface aquifer water, long in contact with radioactive materials, into deeper zones of different and generally higher chemical quality, prior to mining, will further contaminate our groundwater with radioactive materials.

Monitoring, as proposed here, has not prevented this from happening nor have adequate remedies to protect our groundwater from this contamination been successfully implemented in other mining areas. (As examples: Well No. TR-9 at Borden's Big 4 mine in Hillsborough County has displayed a gross alpha reading of 3,700 picocuries per liter, approximately 250 times the recommended level.IMC's Kingford mine's water quality report from May to Dec 1978 for 60 wells listed 23 instances of gross alpha radioactivity above the federal standards). W-60

As to cumulative effects, even before any mines are operating in Manatee County, SWFWMD staff members estimate the amount of water from mining operations presently injected into our Fl. aquifer, which provides water for thousands of Floridians and has been designated by SWFWMD as the best potential source of drinking water for Sarasota County, is between 25 and 30 mgd.

In order to protect our groundwater from further contamination, we recommend against this proposal. Recharge wells should not be permitted until radiation problems are solved.

Further, based on such evidence as exists, to intimidate as the EIS does, that contaminated groundwater will remain under the mining site for the foreseeable future or will migrate only a short distance is, at best, unscientific. W-61

Also, there will be deterioration of groundwater due to the addition of flocculants added to the sand-clay disposal system, seepage losses from highly contaminated recycled water and seepage from slime ponds. W-62

Our surface water will be severely impacted from this proposed mining. It should be noted the cumulative effects of more than one mining operation have not been considered.

The water resource regime will be changed before mining even begins when all vegetation is stripped from an area. This will eliminate plant evapotranspiration, intake of water from the soil and the release of water from all living plant tissues. Small climate changes will result which can significantly alter rainfall regime. Natural flow patterns and storage capacities will be irretreviably altered. Runoff patterns will be demolished as will be natural recharge areas. W-63

The runoff from this mining tract now contributes 11.6% of the total flow into the Manatee River. Even with such reductions as are possible with controls, we can expect steady deterioration of the Lake Manatee watershed as a result of normal discharge of phosphate wastes. As an example, EPA's Surveillance Div. has determined that despite environmental controls, tons of pollutants from mining areas not subject to permitting are pouring daily into the Peace & Alafia Rivers. The average runoff of 11.8 mgd from this site will be just as polluted. W-64

Mining of minor tributaries and bayheads adjacent to major streams will also further contribute to water degradation. W-65

For a minimum of 2 months of the year, 1.959 mgd will be discharged from point 2 into the East Fork of the Manatee River; 3 months of the year, 1.773 mgd will be discharged into the North Fork. This means Estech will dump in the neighborhood of 36,700 gallons per minute of excess water into the North Fork of the Manatee. Aside from the hazards of radioactivity and the residue of known carcinogen reagents used in the flotation process, the EIS concedes that federal/state standards for total suspended solids, total phosphorus and fluorides will be exceeded for varying amounts of time up to 14%. Additionally, we are told fluoride concentrations based on acceptable methods of data projections, cannot meet the state standards at a station near to the Manatee County water plant intake. However, we are not to worry because runoff from an unnamed source will probably dilute this fluoride to acceptable Class I levels. W-66

The applicant acknowledges that NPDES standards cannot be met before mining even begins.

However, we are told Swift will regularly monitor efflunet water quality at the permitted points of discharge to assure compliance with NPDES permit conditions and that these discharges of effluents will not noticeably alter water quality.

Of course, accumulated levels of fluorides, solids, phosphorus, reagents and radium will adversely affect water quality and permit accumulations of harmful materials. It will just be accomplished, perhaps, at permitted levels.

Further, the company saying, when the situation can be corrected, that it is too expensive to clean up or prevent this degrading to water quality discharge from entering the North Fork is not cause for reassurance nor is the fact that monitoring abuse is prevalent throughout the industry and that water quality cannot

often be checked by our regulatory personnel.

We can think of no justification for permitting new source discharges of pollutants that should be terminated by 1985 anyway. This discharge is clearly not in the public interest and should not be permitted.

The 13 mgd, after 3 years 10 mgd, withdrawal by Estech from the deep ground-water system will further divert water that normally seeps through the aquifer south and west through Sarasota. Combined use with the withdrawals proposed by the Beker and Phillips operation will result in withdrawals of 35 mgd of water - 6 times that of the City of Sarasota and more than our Manatee Utilities distributed during its heaviest use period to residents of Manatee County and parts of Sarasota County. This withdrawal may permit further salt-water intrusion into our groundwater. W-07

The proposed rerouting of a portion of the East Fork of the Manatee River will inevitably lead to degradation of water quality.

The decline of water quality and quantity from this proposed mining is inevitable and it will exert its effect upon all water consumers.

Time does not permit a detailed examination of the economic impacts of this proposed facility. Suffice it to say it poses no positive benefit to the area, region or nation. Carefully reviewed, it can only be considered an economic negative.

Finally, it appears several parts of this EIS may be faulty and we cannot, until they are investigated and proven to be correct, accept it as accurate.

In line with its responsibilities to protect the public health, we ask EPA to select the no-action alternative. To do otherwise, when sufficient evidence exists to demonstrate the damaging effects of this industry as it is now operated, is abdicating that responsibilit

SINCE NINETEEN HUNDRED "THE VOICE OF CONSERVATION"

December 12, 1979

John Hagan
E.P.A. Region IV
345 Courtland Street, NE
Atlanta, Georgia 30308

Dear Mr. Hagan:

I would like to offer some remarks on a limited segment of the Estech Draft EIS (Estech General Chemical Corporation, Duette Mine, Manatee County, Florida).

I will restrict my observations to the question of reclaimed soils, largely because I am unsatisfied with the success of reclamation in the Central Florida mining area, and because if the miner is not successful with his reclamation then he has destroyed many thousands of acres of land. If that is the case, then the grand bargain the phosphate industry has struck with the public - to mine but to restore a living earth - will be foresaken.

I cannot say I find the Estech soils section to be confidence inspiring. Soil, regardless of its agricultural potential, is an extraordinarily complex medium with physical, chemical and biological properties. By his action, the miner destroys these properties. His challenge is to replace them.

In section 4.5 - Soils, we do learn the soil "types" of the native substrates that Estech intends to mine. These "types" are well documented in the literature and have meaning to the plant ecologist. That is, he can reasonably predict vegetation characteristics for each of the soil types. But, the EIS states that these soils will be replaced with either "clay" or "sand-clay" or "overburden". These terms have no ecological meaning. W-68

The new soils are predicted to have certain limitations. The clays will be unusable until dewatered. After that, their utility will remain in question. The sand-clay soils will exhibit dewatering problems similar to the clay wastes, according to the EIS. The overburden will be reclaimed for pasture.

In the soils "Mitigation" section (p.54) the defciencies of the

FLORIDA AUDUBON SOCIETY
921 Lake Sybelia Drive • P. O. Drawer 7 • Maitland, Florida 32751
(305) 647-3615

new soils are considered "short term". I see nothing in the section to encourage me to look forward to the bur geoning of a verdant country-side during my lifetime in the Estech mining area in which clays and sand-clays are used. W-69

As for the overburden soils, to reclaim for pasture grass is to commit the area to energy-intensive agricultural techniques just to keep it green. It is green now with no help from man. Why the difference? W-70

As I said in the beginning, soils are complex and alive - literally. Virtually all soils are colonized by remarkably diverse flora and fauna of microscopic size. This microbiota performs various chemical and physical functions, including establishing symbiotic relationships with larger rooted plants that permit the plants to absorb the nutrients the soil may bear.

In mined soils, all this minature life is lost. Consequently, to make pasture grass grow, one must help the grass with machines and chemicals. Pasture grass on the mined sites of Florida is a sign of reclamation failure. It is but a green toupee on the lifeless scalp of mother earth.

To my knowledge, no miner in Florida seeks to reestablish the microbiota of reclaimed soils. That I believe is the chief explanation for the resistance to plant recolonization that so much of the mined land of Florida exhibits. W-71

If that biota could be reestablished, the advance of rooted plants could not be prevented. They would rush to occupy the barren expanses of relatively rich overburden. Ask any farmer who fails to graze or mow his pasture for a year or so. It is very difficult to arrest plant succession in a place like Florida, but the Florida phosphate miner has done it.

Please note that if these soils would accept natural vegetation colonization, one would be assured that the soils were alive and that agriculture could take place if the land owner or county planner desired to exercise that option.

Current reclamation to pasture grass leaves society with only two options: continued maintenance of the pasture at significant expense; or development.

As I believe I once argued on the occasion of the Area Wide EIS, it is incumbant upon the miner to restore to society at least those broad options for land use that society currently enjoys. Restoring the mine site to a less rugged relief, restoring surface water systems to a functional, selfmaintaining status, and bringing the soil back to life would provide most of those options. The healing abilities of nature would take it from there. However, the miner

has somehow blocked those healing powers from working.

The Estech EIS promises no relief from the status quo. Ultimately, the public will bear the burden of forcing the reclaimed soils to grow. That's no good.

The final EIS should more fully address soil biology. Estech, and all mining companies to follow, must show that the thousands of acres of affected landscape will become <u>self-maintaining</u>, living communities. W-72

I frankly don't consider this much of a problem. Coal miners are doing it in the strip mined areas of the Midwest. There exists notable literature on soil microbiota. We can solve the problem if we have the courage to identify the problem.

It's time to get serious on reclamation in Florida. Let Estech lead the way.

Sincerely,

Archie Carr III

Archie Carr III, Ph.D.
Special Assistant to the President for Science

c.c. Florida DNR

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
CENTER FOR DISEASE CONTROL
ATLANTA, GEORGIA 30333

December 7, 1979

Mr. John E. Hagan III
Chief, EIS Branch
Environmental Protection Agency
Region IV
345 Courtland Street, NE
Atlanta, Georgia 30308

Dear Mr. Hagan:

We have reviewed the Draft Environmental Impact Statement (EIS) on the Estech General Chemicals Corporation's Duette Mine, Manatee County, Florida. We are responding on behalf of the Public Health Service.

We are pleased to note that the plans for this facility will incorporate effluent limits and air quality standards that meet new source performance standards. However, we do have some areas of concern with other aspects of the proposed mining project.

We understand the amount of water to be withdrawn from the Floridian aquifer under the comsumptive use permit allows a withdrawal rate of 13 MGD for the first three years of the mining operation. Will the aquifer be able to support this type of drawdown and continue to provide sufficient amounts of potable water to private or public wells in the area beyond seasonal fluctuations? Also, have future residential development and needs been considered in the aquifer potential supply? W-73

The prevention of possible adverse exposure to the workers needs to be addressed in more detail. Epidemiological studies of the phosphate fertilizer and mining industry are presently underway to investigate the question of possible excess lung cancer mortality among workers associated with these industries. The levels of worker protection that will be implemented at the reactors, dragline area, beneficiation plant or other area where materials in process are concentrated needs to be discussed in the EIS. W-74

We assume and expect the level of fluoride emissions for any area of the facility will not exceed the recommended NIOSH standard of 2.5 mg/cu/meter over an eight hour time weighted average.

Also what type monitoring will be instituted in the rock pile transfer tunnels to measure the possible build-up of airborne radon progeny levels? Even though the Duette Mine will have properly ventilated tunnels, close monitoring of these areas would be prudent to prevent excessive occupational exposure. W-75

We noted on page 115 that the EPA guidance for reclaimed lands suggests an upper limit of predicted radon progeny in slab-on-grade homes of 0.009 WL against a normal background of 0.004 WL plus the uncertainty of 0.005 WL. If this assumption is correct, then we agree the Duette site may have to consider the return of topsoil to any residential development site.

Thank you for the opportunity of reviewing this statement. We would appreciate receiving a copy of the final statement when it is issued.

Sincerely yours,

Frank S. Lisella, Ph.D.
Chief, Environmental Affairs Group
Environmental Health Services Division
Bureau of State Services

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

NOV 27 1979

In Reply Refer To:
ER-79/978

Mr. John E. Hagan, III
Chief, EIS Branch
Environmental Protection Agency
Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30308

Dear Mr. Hagan:

We have reviewed the draft environmental statement for the Estech General Chemicals Corporation Duette Mine, Manatee County, Florida, sent to us on October 5, 1979. We strongly support EPA's recommendation that because of environmental considerations, the East Fork Manatee River not be mined.

General Comments

The project is within the range of several threatened and endangered species. Should the responsible Federal permitting agency determine that any of these species may be affected by the work, they should initiate consultation in accordance with Section 7 of the amended Endangered Species Act of 1973 by requesting from the Regional Director, U.S. Fish and Wildlife Service, a list of the threatened and endangered species found in the area. The consultation process is a set, legally established procedure. Coordination with this Service as provided for by the Fish and Wildlife Coordination Act will not relieve the permitting agency of its responsibilities under the Endangered Species Act. W-76

The National Park Service is conducting a study of the Myakka River to determine its potential for inclusion in the National Wild and Scenic Rivers System. We are concerned about several factors of the Duette Mine operation which may set precedents. These precedents may result in the acceptance of mining practices which could have adverse impacts on the Myakka River system should the phosphate industry proceed with planned mining activities within the Myakka River Basin. W-77

The document demonstrates extensive evaluation of archeological and historic resources to date. However, the final environmental statement should provide evidence of full compliance with 36 CFR Part 800 and 36 CFR Part 63. In consultation with the Florida State Historic Preservation Officer (SHPO), the Environmental Protection Agency (EPA) should request determinations of eligibility for the Parrish and Carruthers Mounds from the Keeper of the National Register of Historic Places. If found eligible, EPA should consult with the SHPO and the Advisory Council on Historic Preservation to determine project effects and develop appropriate mitigation measures. W-78

Specific Comments

The document contains no information as to design specifications or construction methods for the tailings embankment. Both the tailings pond location and the past record of failures for tailings retention warrant a closer examination of this particular project element. In estimating the probability of embankment failure, it is stated that the annual risk of a modern dam failure is approximately 1 in 10,000 and it is concluded that in the case of the proposed embankment, the annual risk of failure is "about one chance in 100,000 or one-tenth the probability of a clear water dam failure" (p. 98, par. 3). However, it was reported in the Environmental Protection Agency's notice on Development of Standards for Uranium Mill Tailings and Report on Uranium Mining Wastes (Federal Register, Vol. 44, No. 113, June 1, 1979) that while water retention dams have failed only once in 1,500 to 1,800 dam-years, uranium mill tailings dams have failed once in only 40 dam-years, on the average, or about 40 times more frequently. If those figures are correct, they suggest that the conclusion that embankment failure has an annual risk of only one chance in 100,000 may be optimistic and appears to merit reconsideration or further justification. W-79

It is suggested (par. 3, p. 58) that significant recharge to to the relatively deep Floridan aquifer might occur at the site. The magnitude of such local leakage into the important artesian aquifer should be more thoroughly discussed and assessed in view of the very low leakance values indicated elsewhere (pars. 2 and 5, p. 58, and in Table 4.7A on p. 60). This clarification is significant in impact evaluation because of the importance of the confining layers in protecting water quality. W-80

It is stated that recharge (connector) wells are to be cased for the upper 150 feet or so (p. 64). The tentative casing schedule should be reassessed and explained in view of the probability that the highest levels of radioactivity are found in the lower Hawthorn Formation between about 200 and 400 feet (DEIS: p. 55; figs. 4.7-1, 4.11-2; Radiological Environment Resource Document: p. 23, 26). W-81

The probable source(s) of Coliforms in the shallow aquifer (DEIS: p. 27), the movement of such pollutants as a result of dewatering and recharge operations, and the possibility of effects on the Floridan aquifer through connector well operations should be more thoroughly assessed. The discussion should include at least general plans for methods of monitoring both the shallow and deep aquifers during recharge. W-82

The report states that erosion runoff can cause serious short-term negative impacts (p. 132). It is not clear whether the added sediment loads, or possible increased phosphate levels in the streams, will present risk to the manatee population down river. A map should be included in this portion of the environmental statement showing the mine site in relation to the rest of the county. Without this type of map, we were unable to determine how far this mining operation would be from designated critical habitat of the mantatee on both the Manatee and Little Manatee River. W-83

We appreciate the opportunity to review this statement and will be glad to provide any needed assistance in the areas where we have expressed concern.

Sincerely,

James H. Rathlesburger
Special Assistant to
Assistant SECRETARY

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 4970
JACKSONVILLE, FLORIDA 32201

SAJEN-EE

19 December 1979

Mr. John E. Hagan III
Chief, EIS Branch
U.S. Environmental Protection Agency
Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30308

Reference: EPA 904/9-79-044 NPDES
Application Number: FL0036609

Dear Mr. Hagan:

Corps of Engineers comments on the Draft Environmental Impact Statement for Estech General Chemicals Corporation Duette Mine, Manatee County, are confined to matters within the Corp's functional area of responsibility, and are presented below:

1. Statement on page 58 is that downward leakage into the Floridan Aquifer occurs continuously throughout the project area. On page 139 is the statement that there is minimum recharge on the proposed mine site. Clarification of this point is needed to answer: (a) are the affected wetlands "prime natural recharge areas" (40 CFR 230.4-1 (a)(1)(vi)? and (b) what quantitative effects on recharge function will exist after reclamation? W-84

2. The requirements of Section 7 of the Endangered Species Act are not specified accomplished. Reconciliation of the proposed action with the Florida Wildlife Code or endangered species and threatened species needs definition. W-85

3. It appears that a Memorandum of Agreement with the Advisory Council on Historic Properties may be necessary if mining is to be permitted on the Carruthers Mound (page 165), deemed potentially significant by the criteria of 36 CFR 800. W-86

Sincerely,

JAMES L. GARLAND
Chief, Engineering Division

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
1720 Peachtree Road, N. W.
Atlanta, Georgia 30309

1950
December 4, 1979

Mr. John C. White
Regional Administrator
United States Environmental Protection Agency
345 Courtland Street
Atlanta, Georgia 30308

Dear Mr. White:

We have reviewed the ~~Draft Environmental Impact Statement (EIS)~~ for ~~Gstech~~ General Chemical Mine. The following are our ~~comments~~:

1. Overall, the EIS was well written, particularly those sections pertaining to Water Quality and Wildlife.

2. We support your recommendation on page 108 that the segment of the East Fort Manatee River proposed for mining be left intact as a natural functioning system.

3. On page 123, it is stated that the present longleaf pine flatwoods have been logged, and that the canopy covers less than 10% of the site. With this fact in mind, we would agree with your statement on page 128, that "Timber values are presently small." However, we would add that the timber values are only small because the timber stands are understocked. Under intensive management, timber values would be substantial. W-87

4. On page 128, it is stated that the "Reclamation is designed to replace most natural land communities with improved pasture." We do not feel that the impact of this action is adequately assessed. For example, the table on page 127 shows that almost 5,000 acres of longleaf pine flatwoods will be converted to pasture. In the absence of site specific facts, assume that the average production of timber per year through a rotation is 150 board feet per acre per year, or 750,000 board feet per year on 5,000 acres. The gross stumpage revenues would be approximately $100,000. W-88

We recommend that the Final EIS contain an evaluation similar to the one above. It would also be helpful if the outputs expected as a result of conversion to pasture were calculated, and the two results compared. W-89

6200-11 (1/69)

Attached are some basic facts concerning timber production in Florida's Multi County Planning District #8. The project area is in this district. Should you require information in greater detail, we recommend that the State Forester's office in Tallahassee be contacted.

Thank you for the opportunity to review the Draft EIS.

Sincerely,

For: JOHN A. VANCE
Area Director

Enclosure

cc: State Forester, Florida
Dave Ketcham, WO

NOTE: The "basic facts concerning timber production" referenced above are not included herein due to the volume of the material. The attachments are on file at the EIS Branch offices of the U. S. Environmental Protection Agency, 345 Courtland Street, N. E., Atlanta, Georgia 30365.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
State Office, P. O. Box 1208, Gainesville, FL 32602

November 20, 1979

John E. Hagan, III
Chief, EIS Branch
Environmental Protection Agency
Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30308

Dear Mr. Hagan:

RE: Draft Environmental Impact Statement
Estech General Chemicals Corporation
Duette Mine
Manatee County, Florida

We have reviewed the above subject draft statement and offer the following comments.

On page 128, paragraph 3, it is stated that "the significance of mining will be substantial loss of natural upland habitat and a substantial gain in improved pasture." Although animals may move temporarily from active mining areas to adjoining range, as pointed out, the net result is a loss of the population displaced. Regardless of the size of the animal, the area will not provide much suitable wildlife habitat after reclamation.

It is acknowledged that hunting is an important form of recreation in the region. Therefore, it appears that more thought should be given to the restoration of some wildlife habitat. Developing some diversity in topography and plant life would provide both aesthetic and wildlife benefits, and would be less costly to reclaim than the land use now planned.

We appreciate the opportunity to review and comment.

Sincerely,

William E. Austin
State Conservationist

W-90

UNITED STATES DEPARTMENT OF COMMERCE
The Assistant Secretary for Science and Technology
Washington, D.C. 20230
(202) 377- 4335

December 11, 1979

Mr. John E. Hagan III
Chief, Environmental Impact Statement Branch
Environmental Protection Agency
Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30308

Dear Mr. Hagan:

This is in reference to your draft environmental impact statement entitled "Estech General Chemicals Corporation Duette Mine; Manatee County, Florida." The enclosed comments from the National Oceanic and Atmospheric Administration are forwarded for your consideration.

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. [redacted]

Sincerely,

Sidney R. Galler

Sidney R. Galler
Deputy Assistant Secretary
for Environmental Affairs

Enclosure Memos from: Norton D. Strommen
Environmental Data and Information Service
National Oceanic and Atmospheric Administration

Gordon Lill
National Ocean Survey
National Oceanic and Atmospheric Administration

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
ENVIRONMENTAL DATA AND INFORMATION SERVICE
Washington, D.C. 20235

Center for Environmental Assessment Services

Rec'd PP/EC
30 NOV 1979

November 28, 1979 D24:NS

TO: PP/EC - R. Lehman

FROM: OA/D24 - Norton D. Strommen

SUBJECT: DEIS 7910.12 - Estech General Chemicals Corporation; Duette Mine - Manatee County, Florida

Specific Comment:

Page 31, paragraph 5: The EIS states that the average annual wind speed is 7.3 knots (3.75 mls; 6.3 mph). The last number in parenthesis, however, is not equivalent to the other values; 7.3 knots equals 8.4 mph, not 6.3 mph.

W-91

(RF: D. LeComte, D242)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
Rockville, Md. 20852

Rec'd PP/EC 13 NOV 1979

OA/C52x7:SKM

TO: PP - Richard L. Lehman

FROM: OA/Cx1 - Gordon Lill

SUBJECT: DEIS #7910.12 - Estech General Chemicals Corporation, Duette Mine, Manatee County

The subject statement has been reviewed within the areas of the National Ocean Survey's (NOS) responsibility and expertise, and in terms of the impact of the proposed action on NOS activities and projects.

The following comment is offered for your consideration.

Geodetic control survey monuments may be located in the proposed project area. If there is any planned activity which will disturb or destroy these monuments, NOS requires not less than 90 days' notification in advance of such activity in order to plan for their relocation. NOS recommends that funding for this project includes the cost of any relocation required for NOS monuments. Attached are data locating and describing monuments in the vicinity of the proposed project.

Attachments

W-92

NOTE: The attached data "locating and describing monuments" referenced above were used in field surveys to locate geodetic control survey monuments in the proposed project area and are not included herein.

MARY L. JELKS, M.D.
PEDIATRICS
1700 SOUTH OSPREY
SARASOTA, FLORIDA 33579

TELEPHONE (813) 366-2002

(DIPLOMATE OF AMERICAN BOARD OF ALLERGY AND IMMUNOLOGY) (DIPLOMATE OF AMERICAN BOARD OF PEDIATRICS)

Nov. 28, 1979

John E. Hagan III
Chief, EIS Branch
EPA Region IV
345 Courtland Street, N.E.
Atlanta, Ga 30308

Estech General Chemical Duette Mine

Policies that would encourage rapid phosphate mining in Florida today should consider the very rapidly changing economic international stresses. Since our main positive product in the world trade is our agricultural exports and these are a result of our farming practices with the use of fertilizers, we should be concerned about depletion of our phosphates. It may be of more value in our land undeveloped than to be so eager to place it into foreign markets, competitively priced. In the near future the lands that we hold in central Florida may be of more value as they are now, than the little profit gleaned plus the very lessened value after expensive recommended reclamation. A third area of stress, I can foresee in the future will be a shortage of cheap water resources, and this again will be poorly managed in a policy of allowing rapid phosphate mining now. W-93

In the EIS draft there are questions:
1.2 I question that the water management plan can recharge the Floridan Aquifer without contaminating it. W-94

2.2 last paragraph--How can annual SO2 emissions be the same for alternative one and two, with 1.5 million TPY and 3.0 Million TPY, respect. W-95

2.3A The Case 2 seems the most credible plan, since the loss of the East Fork Manatee R. is not acceptable in case 1. W-96

2.11 Rock drying alternatives should be considered. The energy saving at the foreign destination is not relevant to the US and the expense and pollution generated by rock drying is unacceptable. The company is pretty flip about lung dosage radiation near rock dryers when actually we are not very knowledgeable about these factors, since they are only now being studied. Also the ambient radiation released from phosphate rock mining and gypsum ponds and tailings has not been adequately studied. According to Donald Guthrie and Sam Windham(Polk Co. Eng and EPA Montgomery) there is considerable radioactivity and it continues for a number of years after abandonment of mining. Studies of radiation are in process and as this knowledge is developed, it should be allowed to alter any decisions that are made and strategies to curtail radiation dispersed. (For instance, neutralization of the acidity would decrease the release of radioactivity). The art of storage of the piles of waste gypsum needs further regulation. In 1975 a sinkhole opened up beneath a gypsum pile and dumped the radioactive contents into the underground Florida Aquifer from which many wells obtain water. The Brewster incidence of lung cancer has challenged the attitude of the phosphate industry in regard to the absence of serious health effects. The statement of some employees that W-97 W-98

some of the more hazardous esposure jobs were not regular employees but done by contract and follow up has been difficult, statistically.

4.2 The weight values of the TSP may not give as serious a picture as we might understand if we knew the type of particles, size, and radioactivity and chemical variety. Technology has not come to grips with this measurement yet but I suspect TSP fromthis activity is worse than TSP of same amount weight from some other industries.

4.2 Sulfur dioxde effects-- there is no consideration of the effects of the increased energy demand and increased background from the power sources, which again are using higher sulfur than when this draft was drwn up--page 45 refers to use of fuel oil containing no greater than 1% sulfur--where can they get that now.
Radiation comments were not very reassuring in that nothing was mentioned about the alpha emission which is soluble and also of serious concern. Gamma is more penetrating but the alpha gets into the air and water and will be available to the population as the ore is uncovered and emission occurs.
The reclamation section is optimistic. The recovery of natural vegetation will never recur. To replant and develop these areas will take 50 years. In the meantime, what will the policy be for handling the hazardous wasteland. The slime ponds are very dangerous and the dams have had many failures. The removal of the water from our limestone undergorund will make the area more prone to collapse and dam breakage with auifer contamination. We are also due to have a hurricane if the 1in 20 yrs rule is true. How safe are the clay embankments to heavy rains and how much fluride and acid will escape with the radioactive contents?

Please implement the newer guidelines being developed by EPA, require recovery of uranium and fluride, lining of the waste ponds with impervious material, eliminate rock drying, require strict compliance with water consumptive uses, require reclamation rules and post such lands as hazardous until they are safe, avoid conventional slime ponds and do not allow mining of the East fork of the L. Manatee R.

Sincerely,

M. L. Jelks, M.D.

W-99 W-100 W-101 W-102 W-103 W-104 W-105 W-106 W-107 W-108

EPA Hearing on Este (Swift), November 28, 1979, C, Bradenton

Hilda Quy, 1619 Palma Sola Boulevard, Bradenton, Florida 33505

I refer first to page 2, Project History, of this EIS. "Other local, state and federal permit applications are in various phases of development. . ." This should be corrected to show that the Manatee County Commission last August voted 4 to 1 to deny the special exception applied for by Estech. That decision was entirely within the authority of the local legislative body. W-109

Many concerned local citizens objected to the first application to mine in our county because phosphate mining threatens our environment, our health and our quality of life. We objected to the second, the third and the fourth applications, citing cumulative, increasingly dangerous effects. When Swift, the fourth company, applied, our County Commission denied the permit, in our opinion weighing the significance of the cumulative effect of several mines. W-110

Nowhere in this EIS do I find reference to this factor. I ask you, the United States Environmental Protection Agency, at what point you would be concerned with the cumulative effect of an industry you know to be hazardous? At the 10th mine? The 100th? When a dragline has walked over every square inch of vacant land in Manatee County? Our local governing body has said "this far and no farther". How can you, the Environmental Protection Agency do less? How can you ignore the total environment?

Second, I question the objectivity of Conservation Consultants, Inc. which has prepared part of this report. This company is employed by Port Manatee whose present and potential profitability is closely linked to growth in phosphate shipment. This firm has a financial interest in increased phosphate business for the Port, creating a clear conflict of interest by participation in preparation of this EIS. In addition, the firm's employer, the Port Authority is made up of our County Commissioners. Estech is now involved in litigation with our County Commission. Conservation Consultants may be incapable of recognizing a conflict of interest here but it is astounding that EPA has cooperated in such a violation of professional ethics. W-111

In fact, without commenting further, it appears that holding a hearing at this time may well be a serious interference in the judicial process. W-112

It is impossible in a few short minutes to deal with many substantive issues raised in this EIS, so I will simply touch on a few at random which are symptomatic of the superficiality and bias in the document.

1. The recently completed EPA Area-wide phosphate EIS made some courageous recommendations for improving the industry's operations in the future. Among them were elimination of rock driers and of above-ground slime ponds. Not requiring Estech to conform to either of these two recommendations makes a mockery of the Area-wide study. W-113

2. The last page of the Summary Sheet states that the operation ". . . will be self-sufficient in terms of minor medical treatment, water supply, fire and police protection, . ." Within the last two weeks, an explosion and fire at the International Mining and Chemical Co. near Bradley Junction required firefighting units from Bartow, Lakeland, Mulberry and New Wales and foam units from McDill Air Force Base at Tampa. So much for self-sufficiency. The taxpayer is stuck with the bill as usual. W-114

3. Page 23, under "no-action" alternative, we read ". . .a potential for positive impact on the United States balance of payments would be lost due to unrealized sale of the rock product. . ." If this simplistic argument is permitted in a supposedly serious document, an unbiased statement must add that, with 6% of the world's population using 30% of the world's fossil fuels, nearly half of that imported, America's unfavorable balance of trade is due to our excessive use and importation of oil and that, furthermore, at our present rate of mining and exportation of phosphate, the U. S. will be dependant on imports of fertilizer within as little as two decades. Dr. Ellis Verink, Chairman of the U. of Florida Materials Science and Engineering Department recently said "Many indicators suggest that non-fuel materials will represent the next national crisis for the United States." An OPEC-type fertilizer cartel can then hold us hostage as easily as we are held hostage by oil producers today. You can not throw in a glib, one-sided remark about balance of trade without some semblance of unbiased treatment of the issue. W-115

4. On page 103 are outlined various measures to prevent the possibility of a settling area (slime pond) failure and release of waste clay (slimes) to the Manatee River. These mention "design by an experienced professional engineer. . .thorough investigation of foundation and soil conditions. . . daily inspection by qualified representative. . .annual inspection by a registered professional engineer. . " etc.

On February 26, 1972, 125 persons were killed when three coal waste dams collapsed in Logan County, West Virginia.
On June 6, 1976, the Teton Dam collapsed in Idaho, killing 11 persons.
On November 6, 1977, an earthen dam failed at Toccoa, Georgia, killing 39 persons.
On October 31 of this year, the FP&L reservoir near Indiantown ruptured, flooding an area three miles wide by 22 miles long.
No doubt in each case the dam was designed by a so-called"registered Professional engineer" who would have said the chance of failure was nil.
On page 52 of the EIS, we read that "limitations on use of the surface soils for construction of homogeneous pond embankments are considered severe." Who will be out there watching that none of these poor soils are used in slime pond embankments. Registered professional engineers have been unable to restore the Peace River since a slime pond dam break killed it many years ago.

W-116

The truth is, dam safety in Florida is in limbo. Responsibility is ambiguously shared among the DER, the Corps of Engineers and water districts, with inspection meagerly funded. These Estech slime ponds will contain vast quantities of hazardous waste. The drinking water of many thousands of people is at stake if a dam should fail.

5. A reading of Section 4.12, Biology and Ecology, leaves the impression that even the authors of this document bleed a little. Page 141 states: "Wilderness Area: The wilderness area will consist of spoil piles which will be allowed to become revegetated by natural means. The vegetation of similar sites throughout the central Florida phosphate district consists of woodlands which do not closely resemble any indigenous plant communities in structure or species composition." If you have seen Polk County, you know an understatement when you hear it.
Later, we read ". . .The steepness of the slopes will retard the establishment of more luxuriant vegetation. This vegetation will have a low aesthetic value. The angle of slope will cause continual erosion in wet seasons. . ."

I quote the author earlier, page 51, "This area, termed "wilderness" by the applicant, will result in permanent, parallel rows of steeply sloped island chains in the northernmost created lake," I doubt if any dictionary so defines wilderness. W-117

While an entire 18-acre cypress swamp will be saved and all of 50 acres of sand pine scrub as well, we read "it is unknown whether or not the swamps and marches on reclaimed land will have as high a value as they presently have. ." and also "Natural habitat restoration as proposed for the Swift site has not been attempted previously". (140-41).

5. From your million dollar area-wide study, you in the Environmental Protection Agency know the phosphate industry poses serious dangers to the environment and to mankind. I believe you reported in June that Florida phosphate mines pose radiation hazards to local residents that could increase risks of lung cnacer by as much as 50 per cent. You know that Florida has three times as much chemical waste as any other state, much of it from Polk County's phosphate industry. It is hard to understand how you can complacently give your stamp of approval to create more of the same against the wishes of the people of Manatee County and our own local government. I ask simply that you take another look at your name, the Environmental Protection Agency, and act accordingly. W-118

1619 Palma Sola Boulevard
Bradenton, Florida 33505

December 11, 1979

Mr. John E. Hagan III
Region IV, U. S. EPA
345 Courtland Street
Atlanta, Georgia 30308

Dear Mr. Hagan:

Recent news reports indicate that the sand/clay mixing technique, proposed by ESTECH in the Draft EIS has not been successfully used by Brewster Phosphate Co.Please see the enclosed editorial from the SARASOTA HERALD-TRIBUNE, December 9, 1979.

In view of this evidence, I would like to request that account be taken, in assessing ESTECH's application for permits, of the probability that the company would be led to "Case I" (pages 12-15 of the EIS) when it finds that "Case II" is not a viable method of reclamation of mined land. This alters the whole proposal as it relates to the recommendations of the Area-Wide study on slime ponds, and also as it relates to damage to the environment and subsequently the people of this area.

Sincerely,

Hilda Quy

W-119

NOTE: The December 9, 1979 editorial is on file at the U. S. Environmental Protection Agency, Region IV, EIS Branch, 345 Courtland Street, NE, Atlanta, Georgia 30365 and is not included herein.

Nov. 28th, 1979
[illegible]
Longboat Key 33548

I represent many of the Senior Citizens of this county who came here to preserve their health and prolong their lives. Many of us have a respiratory distress and Emphasema so need clear air and clean water to live. Since we form a rather large percent of Manatee County population we depend on our county Environmental Protection Agency.

Allergist Specialist Dr. R. Lane studies show a clear relationship between the rise and fall of chemical pollution levels and hospital admissons. National and State existing standards now do not protect these senior citizens. Additional studies also show increases in chemical pollutants such as nitrogen oxide - sulfur oxide and the radio active gases caused by phosphate + uranium waste. are harmfull to respiratory health. These released pollutant gases are known carcinogens.

A Florida Health and Rehabilitation Service investigation showed the region of Borden Chemical Plant to be a most infected area. With the accumulated pollutants from 3 Phos. Companies the human [illegible] will be endangered [illegible]

We Senior citizens depend upon Public Health and the E.P.A to protect the air and water quality of Manatee County and refuse further pollutant industries.

Mary B. Greer
B.A. Stetson University Fla.
M.A Health Ed. Northwestern Univ. Ill
Dir " " Winnetka Schools - Ill. [illegible]

W-120

J. Scott Brown
P. O. Box 3498
Sarasota, Fl. 33578

December 7, 1979

Mr. John E. Hagan
U. S. Environmental Protection Agency
345 Cortland Street
Atlanta, Georgia 30308

Dear Sirs;

In regard to the Environmental Protection Agency public hearing of November 28, at Manatee Junior College: I would like to consider the ultimate "reclaimed" condition of S-Techs' Duette mine.

The proposed Duette mine is presently very productive land. It consists of palmetto and pine flatwoods and hummock, wetlands.

This land supports healthy populations of Deer, Turkey, Hogs and many other game and non-game animals.

The agricultural use of the lands include cattle production, citrus groves, tomato and watermelon farms.

The wetlands on the proposed site are shallow and seasonally dry. The ponds are never more than six feet deep and usually average closer to six inches in depth.

These wetlands are very productive in terms of wildlife. They support a fantastic variety of birds, small mammals, reptiles and amphibians. Not known for large fish, these areas do produce a large volume of small fish and invertebrates, which form a major part of the food web.

S-Tech proposes to leave certain sensitive hummock and swamp areas unmined. They also say valuable new wetland habitat will be created by mining. S-Tech admits that a large percentage of the land will be left in the form of spoil banks. What remains is for reclamation.

The process of mining will destroy all the natural stratification that exists down to a depth of one hundred to two hundred feet. Gone will be the impermeable and permeable layers that give the land its water holding characteristics. Because of this, land that is eventually returned to native grade and replanted would be unable to hold water normally.

W-121

The areas that S-Tech does not mine will be surrounded by mining activity. When a swamp or a hard wood hummock suddenly becomes a mesa, what is going to stop it from drying out?

The valuable wetlands S-Tech proposes to create will likely be huge pits. Deep and slab sided, this type of lake wouldn't have the productive shallows of natural wetlands. Without any rooted bottom life there is not any basis for a food web. Only floating plants could exist, such as water hyacinths.

Twenty years hence, when mining is complete, the dense rank growth that colonises disturbed land will have taken over. Palmetto and pine will be replaced by dog fennels and briars; hard wood hummock, that formerly provided wildlife with food and shelter will be replaced by the very undesirable exotics, melalucca, Brasilian pepper and Austrailian pines.

If mining proceeds as planned, we will be left with unusable and unreclaimable spoil banks, land vegetated by exotics, leaving it of little practical use, and lakes that will be largely steril except for water hyacinths. If reclamation can not be more complete than this, a phosphate mine is not justified.

J. Scott Brown
Bachelor of Science Biology
Sarasota, Florida

W-122 W-123 W-124

Robert A. Lyman

Acreage - Management - Consulting, Appraising

REG. REAL ESTATE BROKER / TELEPHONE: 747-5855
755-8790

5422 — 26th STREET, WEST
BRADENTON, FL 33507

November 28, 1979.

Mr. John E. Hagan III
Chief, EIS Branch
Environmental Protection Agency
Region IV
345 Courtland Street, N.E.
Atlanta, GA 30308

Re: Environmental Impact Statement
Estech General Chemical Corporation, Duette Mine, Manatee County, Florida Draft EPA 904/9-79-044 October 1979

Dear Mr. Hagan:

The above document has been received from Mr. John C. White, Regional Administrator to me as a concerned individual.

This document and the resource documents have been reviewed, with interest. The following comment is respectfully submitted.

These voluminous documents have the potential of being good references for economic and academic uses. However, there is need for corrections, revision, and more clarification in the agricultural presentations. W-125

This is important as the highest and best use is agricultural and will continue after mining. It is currently a high potential for the future needs of more intensive uses and yields.

You can and should correct and improve your documents by becoming involved with personalized direct exchanges with local agencies for basic and common information as well as potential planning. This includes: W-126

Land and Water	USDA Soil Conservation Service
Forestry	Forest Service, State of Florida
Economics	Economic Research Department IFAS, University of Florida
Roads	Manatee County

This includes pages 120,122,123,128,138,139,157. The subjects presented are too diverse and voluminous for any one individual or agency to adequately review or present.

Thank you for this opportunity, to show my concern.

Very truly yours,
Robert A. Lyman
Robert A. Lyman

cc: List attached

Mr. John E. Hagan III, EIS Branch, EPA November 28, 1979

cc: List

Louis E. Driggers, Chairman, Manatee County Commissioners
Court House, Bradenton, Florida, 33505

I.H. Stewart, District Conservationist
U.S.D.A. Soil Conservation Service
P.O. Box 965
Palmetto, Florida 33561

J. Walter Prevatt, Extension Area Economist
University of Florida
Institute of Food and Agricultural Sciences
5007 6oth Street East
Bradenton, Florida 33508

George Montgomery, III, County Forester
Florida Department of Agriculture
& Consumer Services
4723 - 53rd Avenue E.
Bradenton, Florida 33508

Dr. C.W. Hendry, Chief
Bureau of Geology
903 West Tennessee Street
Tallahassee, Florida 32303

MANASOTA - 88

A Project for Environmental Quality 1968 - 1988

Re: Estech EIS - AIR QUALITY SECTION
listed as Prepared by Dr. John Schatzmeyer.

Dr. Schatzmeyer prepared information re: the air quality in the Agrico Case.

Please refer to p. 8/22 where you can see marked by me what he neglected to consider in his report. This is a matter of record & the information was derived from Dr. Schatzmeyer while he was under oath.

Glenn C. Rains
28 Nov '79

W-127

the transfer point between the inclined conveyor belt and the elevated conveyor belt and for various places above and around the storage pile. No water sprays have been planned for spraying into the ships' holds. To catch sulphur dust, U-shaped concrete beds are planned for underneath all of the conveyor belts and the head pulleys of all conveyors are to be equipped with scrapers.

In support of its application, Agrico caused estimates of sulphur dust emissions from the proposed facility to be made. The only emissions considered, however, were those to be anticipated as a result of sulphur falling from the elevated conveyor belt onto the stockpile, wind erosion of the stockpile, vehicular traffic around the stockpile and scooping from the stockpile by front end loaders. The great bulk of the emissions reasonably to be anticipated and a substantial majority of the proposed emission points, including the most significant emission points, were omitted from consideration. These omissions went unnoticed by the DER personnel who recommended issuance of a construction permit to Agrico.

Material referenced by Comment W-127

In preparing emission estimates for submission to DER, it was assumed that prilled sulphur would have an emission factor comparable to the emission factor for aggregate. Subsequently, other experts assumed prilled sulphur would have an emission factor like coal's. Making such assumptions is acceptable methodology in the absence of information about a particular material but the possibilities for substantial error are significant.

Dusting properties vary even among different types of sulphur prills, depending on, among other things, their friability, method of manufacture, moisture content, and the distribution of particle sizes. Water formed or "wet" prills are produced by introducing drops of molten sulphur into a stream of water or a "quench tank"; air formed or "dry" prilling techniques use air to cool drops of molten sulphur, transforming

MANASOTA - 88

A Project for Environmental Quality 1968 - 1988

November 29, 1979

Mr. John E. Hagan III
Chief, EIS Branch
U.S. EPA, Region IV
345 Courtland St. NE
Atlanta, Ga. 30308

~~Re: Estech EIS~~

Dear John:

I am not quite sure my request to withhold a decision re: the issuing of the Estech permit, if indeed this is the agency's desision, until all litigation has ended re: Estech was clear.

What I intended to convey is the prejudicial effect even the announcement of intent to issue a permit could be expected to have on the outcome of pending litigation.

We would certainly hope such action is withheld by EPA.

Additionally, quite frankly until many serious issues raised re: this EIS are settled, we do not see how EPA could even contemplate the issuance of such a permit.

Thank you for your interest.

Sincerely,

Gloria Rains

Gloria C. Rains
Chairman

Reply: 5314 Bay State Rd.
Palmetto, Fl 33561

c: Mr. Perry

W-128

SWIFT AGRICULTURAL CHEMICALS

December 10, 1979

An Estech Company

Mr. John E. Hagan, III
Chief, EIS Branch
United States Environmental
Protection Agency
Region IV
345 Courtland Street NE
Atlanta, Georgia 30308

Re: Estech General Chemicals Corporation
Duette Mine, Manatee County, Florida
Draft Environmental Impact Statement
(EPA 904/9/79/044) and Draft
NPDES Permit No. F10036609

Dear John:

The following comments are submitted on the above-referenced draft environmental impact statement (EIS) and draft NPDES permit in response to the public notice dated October 5, 1979. Estech General Chemicals Corporation (Estech) is the permit applicant in this case and has proposed the activity that is the subject of the draft EIS. Accordingly, Estech is a vitally concerned member of the public.

Estech supports the overall analyses, conclusions and recommendations concerning proposed action set forth in the draft EIS. The document represents many months of intensive effort by numerous expert consultants and is a significant contribution to the public's understanding of impacts, mitigating measures, and alternatives pertinent to the phosphate rock mining and processing industry in Central Florida.

Estech is disappointed that EPA has tentatively proposed to include in the final NPDES permit the condition that no mining is to be carried out in that portion of the East Fork of the Manatee River designated as "Class I Wetlands". Estech is confindent that mining the valuable resources located beneath this segment of the river could be carried out without significant long term adverse environmental impacts. Indeed, Estech's plans would have required demonstration of an effective program

Swift Agricultural Chemicals Corporation
First Commercial Bank Building - Suite 275
410 Cortez Road West
Bradenton, Fl. 33507
Tel: (813) 758-8688

for the relocation and restoration of the stream bed prior to beginning mining. Furthermore, Estech has serious reservations concerning the authority of the Agency to insert "dredge and fill" type requirements (especially an absolute prohibition) in an NPDES permit. Estech has, however, elected to acquiese in the proposed action of the Agency in light of its need to commence mining operations at the earliest time consistent with applicable laws and regulations.

Prompt further action, including preparation and issuance of the final EIS and final NPDES permit, is of extreme importance to Estech. Estech made initial contact with the Agency concerning this project in November, 1977. After discussions with the Agency, Estech elected to use the "third party" approach for the preparation of a draft EIS in order to avoid unnecessary delays in the process. Now, two years later, after the expenditure of nearly $500,000 by Estech for the preparation of the draft EIS under EPA supervision, there is some indication that the Agency may be considering deferral of final action on NPDES permit issuance pending the resolution of local land use matters. Such deferral can only lead to additional potential delays in the permitting of this project. Such delays would be severely detrimental to Estech because of binding commitments to supply phosphate rock to customers. Estech must obtain all necessary construction approvals and permits by June of 1980 in order to meet an already very tight construction schedule.

Estech is committed to compliance with all applicable federal, state and local environmental and land use requirements when properly interpreted and enforced. All parties with the necessary standing should be afforded ample opportunity to present their views on the proposed Duette Mine in appropriate forums. Estech believes, however, that this time should be spent in considering the merits of the issues. No time should be wasted on purely procedural grounds. Deferral of final action in the NPDES permit is very likely to lead to such waste.

Estech believes that proposed major industrial developments such as phosphate rock mine and beneficiation facilities should undergo thorough preconstruction environmental review and approval procedures. These procedures, however, should proceed expeditiously and should not result in inordinate delays in needed industrial development.

W-129

Over the last two years, inflationary pressures have resulted in a 15% annual increase in the costs of building materials, labor and equipment. The proposed Duette Mine is a $160,000,000 Project. This means that every month of delay in commencing construction will add in excess of $2,000,000 to the overall costs of this project. The Agency must not be a party to any unnecessary delay resulting in such massive, wasteful and inflationary cost increases.

It is clear that final action by the Agency on the NPDES permit will not preclude state or local officials from carrying out their appropriate mandates under applicable laws. Section 510, Clean Water Act; 40 C.F.R. § 122.11(d)(3). On the other hand, pending local issues should not be allowed to preempt federal action on matters expressly made subject to federal review.

Estech urges the Agency to move with reasonable speed to respond adequately to public comment, to formulate the final EIS, and to issue a final NPDES permit authorizing a waste water discharge subject to appropriate terms and conditions in accordance with applicable regulations.

Sincerely yours,

ESTECH GENERAL CHEMICALS
CORPORATION

Joseph E. Davis

Joseph E. Davis
Manager of Projects

JED/nal
cc: Mr. John C. White, Regional Administrator
Charles Perry, Esq., Regional Counsel

save our bays
ASSOCIATION, INC. P.O. BOX 1333/SARASOTA, FLORIDA 33578

PRESIDENT
Fred C. Duisberg

VICE PRESIDENT
Dante Vezzoli

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Eldridge Carnes
Jerome Chambers
*Charles R. Covert
Mrs. Agnes Cowap
*Joseph F. DeNinno
*Fred C. Duisberg
*John L. Engels
Gen. Arnold Funk
Homer Greer
Ansel E. Gridley
J. Randall Grobe
Franklin H. Graf
James A. Haley
Robert Hattersly
Ms. Anita Hocker
Clinton Johnson
Robert M. Johnson
Dr. Karl Keeler
Ms. Mary Kumpe
*Mrs. Wilfred A. Le Page
Carlyle A. Luer, M.D.
*Robert Maas
*John Malpezzi
*Mrs. Jeanne McElmurray
*Lori Lee Mowe
*Christy Payne, Jr.
William E. Pensyl
Edward Petrick
*Jonathan Pugh
John W. Robinson
Mrs. Rita Roehr
Tony Saprito
Larry Spalding
*Ted Sperling
Dr. William Tiffany
*Col. Dante Vezzoli

*Indicates Executive Committee

(see reverse)

Fred. C. Duisberg
Rt. 1 Box 526
Englewood, Fla.
33533

Dec. 4, 1979.

John E. Hagan 111
U.S.E.P.A. Region 1V
345 Courtland St.
Atlanta, Ga. 30308

Dear Mr. Hagan:

Enclosed are copies of the Save Our Bays Assoc./ A.C. Neilsen Co. Survey, relating to phosphate mining and processing rafered to in my presentation at your recent hearing at Manatee Jr. College. I am also enclosing a copy of the summery news reportoof this survey made by the Sarasota Herald-Tribune on 6/13/79,

We believe the scope of this survey and the way it was conducted completely assures its credibility and need for any agency charged with protecting the public interest to fully consider these conclusions before making decisions on the matters covered.

We can not add to information supplied at your public hearing but would urge that no further permits relating to phosphate mining and processing be granted by U.S.E.P.A. at this time. Positive information regarding enviromental effects and cumulative results will not be available until presently permitted mining and prcessing operations have been underway for suffient time to allow thourough monitoring and evaluation. There is no justification for urgency in permiting and in fact the protection of this essential and irreplaceable resource can only be of benefit to our nation and its future. Piecemeal or premature permitting may destroy the confidence that the public must have in our regulatory agencies for them to function properly.

With thanks for your consideration of these remarks.

Sincerely,

Fred. C. Duisberg

W-130

Exhibit 11

RESPONDENTS' OPINIONS REGARDING REGULATION OF PHOSPHATE MINING AND PROCESSING PENDING THE ESTABLISHMENT OF ASSURED SAFEGUARDS THAT MAY IMPACT ON THE ENVIRONMENT OF SARASOTA COUNTY

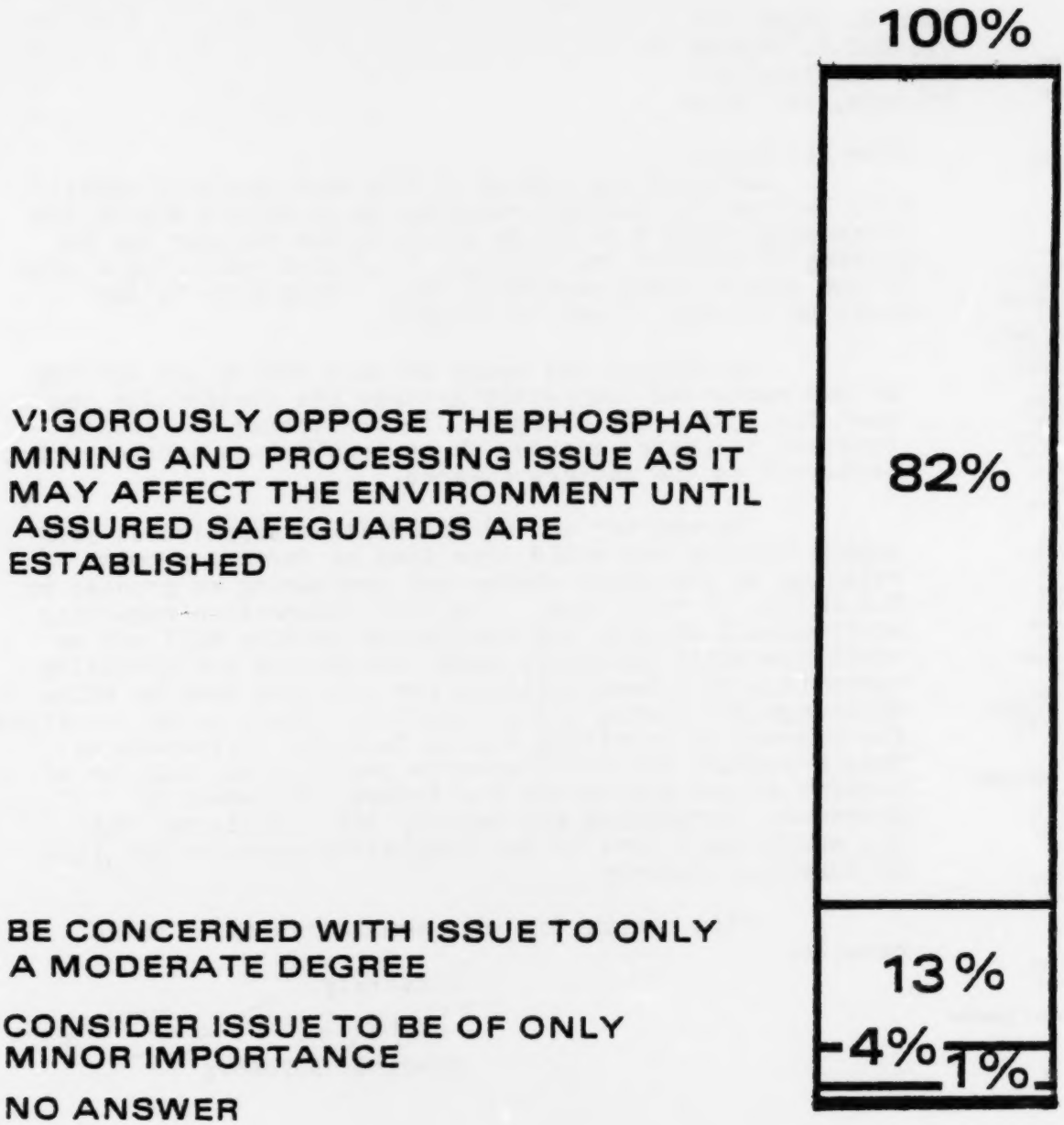
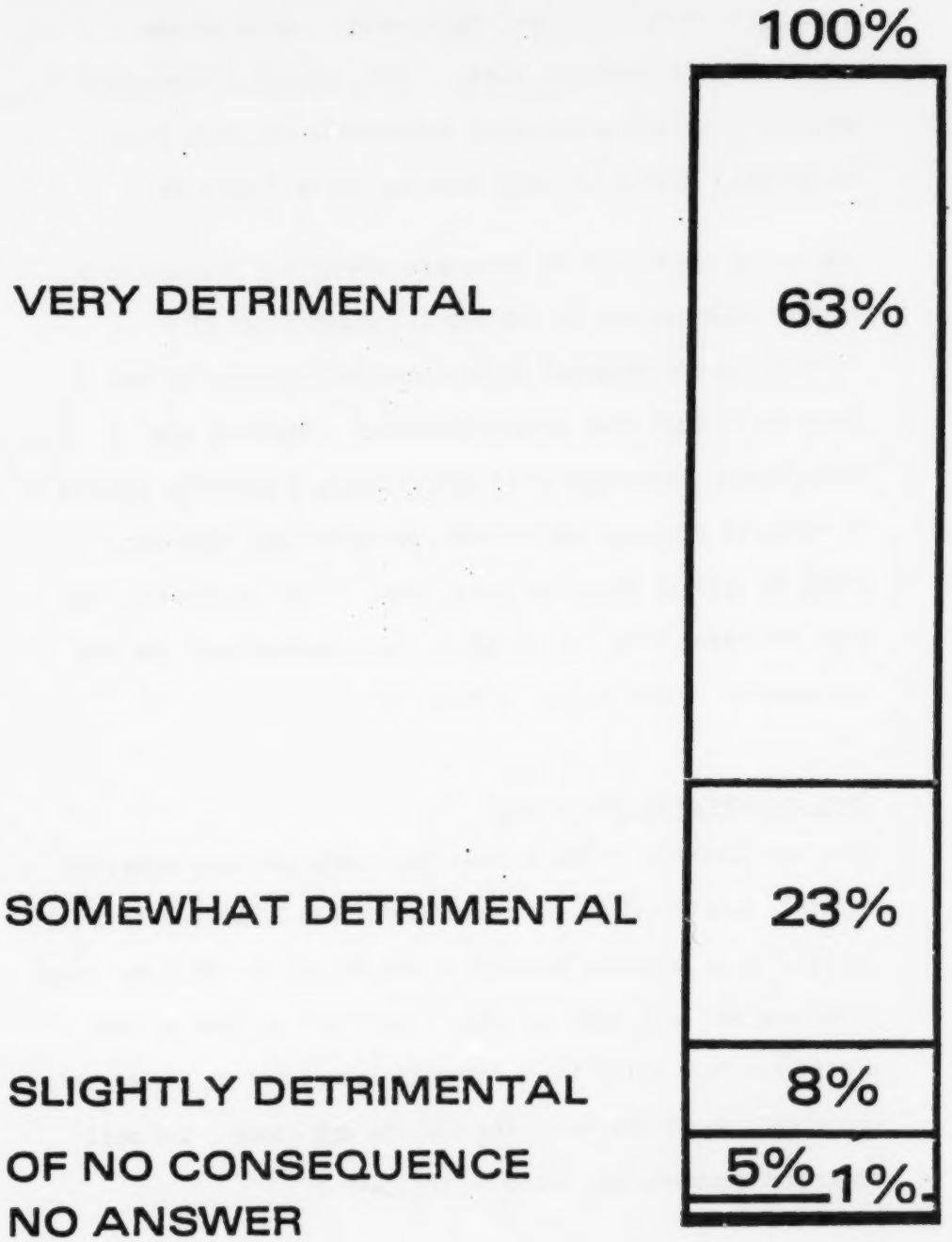


Exhibit 10

RESPONDENTS' PERCEPTIONS OF THE PHOSPHATE MINING AND PROCESSING ISSUE AS HAVING AN IMPACT ON SARASOTA COUNTY'S ENVIRONMENT



IX. Phosphate Mining And Processing Is Perceived As Being Very Detrimental To The Environment And The Issue Should Be Vigorously Opposed Until Assured Safeguards Are Established.

Exhibit 10 reveals that 63% view phosphate mining and processing as having a very detrimental impact on the environment in Sarasota County. This composite percentage compares with 42% among those individuals who have lived in Sarasota County for less than two years (Table 49).

The strong opposition to phosphate mining and processing is further demonstrated in Exhibit 11, where 4 out of 5 individuals are reported to be vigorously opposed to the issue until such time as environmental safeguards are established. Although still constituting a majority opinion in terms of vigorous opposition, the part-time residents (73%) as well as those who have lived in the county for less than two years (70%) are slightly less opposed than are the respondents in composite. (Table 50)

X. Open End Comments (Table 56)

The last question in the survey instrument was open-ended in nature. Specifically, the respondents were requested to offer any advice or comments concerning the future of Sarasota County which may not have been covered in earlier sections of the questionnaire. Fifty-seven percent elected not to answer this question. Among the remaining 43% who did answer, the most important comments are cited as follows:

Sarasotans Favor Regulated Growth, Poll Shows

JUN 13 1979

By JOHN HEILSCHER
Herald-Tribune Reporter

An overwhelming majority of Sarasota County residents favor a regulated annual rate of population growth, stricter air and water pollution controls and leaving the airport at its present location, according to a new survey on local matters.

Most people surveyed feel living conditions here have deteriorated over the years and government should use taxes to improve services for current, and not future, residents.

The Save Our Bays Association (SOBA) presented its professionally conducted and analyzed survey to the County Commission Tuesday. While most of the opinions should come as no surprise, the intensity of local feelings on the issues appears stronger than anticipated.

For example, 90 percent of the respondants approved restrictions on population growth, 91 percent want a regulated growth rate, 97 percent favor stricter enforcement of zoning controls, 98 percent opposed development of wetland areas and 99 percent want tougher pollution controls for Sarasota Bay.

Regarding phosphate mining, 97 percent said they were against it until assured of adequate safeguards from pollution. Only 3 percent dismissed mining as of minor concern. Eighty-four percent said they vigorously opposed phosphate mining while 13 percent were moderately against.

And 63 percent of those surveyed prefer upgrading the Sarasota Bradenton Airport at its present home with 16 percent opting for relocation and enlarging the facility. One percent gave no answer.

SOBA President Fred Dulsberg and former president Charles Covert presented the results, which are divided into an overall summary of attitudes and a detailed breakdown of the issues to demographic characteristics.

"The response to the survey has been overwhelming, the answers have been crystal clear," Covert said.

"Until now, none of us had the privilege of knowing what was in the minds of the voters of this county," he said. "In view of these startling results, there seems a real question whether this county can continue on without a solid restriction on the rate of growth and a strict enforcement of established zoning."

SOBA spent about $12,500 to have the A. C. Nielson Co., the world's largest research organization, compute and analyze the responses of about 6,500 residents. A questionnaire was sent out in April to one-fifth, or about 20,000, of the registered voters.

County commissioners took no action on the report since they had no time to read it, but the information could become part of the developing Comprehensive Plan for Sarasota County.

The questionnaire sought

(Please Turn To Pg. 14A, Col. 1)

(Continued from Page 1A)

opinions on current and future issues, using a five-point "favor-oppose" scale to measure the intensity of attitudes. Suggested courses of action for government to employ were also measured.

And the results show that residents want tougher controls on development, better water services, consolidation of some city-county services — in a nutshell, they want the best quality of life possible.

"Seventy-three percent are of the opinion that living conditions in general are currently less satisfying than in the past while 5 percent of the residents claim their living situations are better now than formerly," the report said.

Police and fire protection, drinking water service, air travel and sewer service were rated as at least the same or slightly better than before. But parks and beaches, responsiveness of county government, boating conditions, the local tax situation, bay water quality and air pollution were all rated between the same and worse than before. Vehicle traffic was given the lowest rating.

Most respondants want a countywide, "pay-its-way" public transportation system, the survey indicated. Almost 70 percent said they strongly or moderately favored countywide public transit, but 31 percent said they might or might not use it, 18 percent said they "probably" would not use it and 6 percent said they "definitely" would not.

Centralized control of water and sewage disposal was preferred by nearly a 3-to-1 margin over non centralized control, the report showed.

"Sixty-eight percent of the respondants believe the residents of Sarasota County would be better served with centralized control of drinking water and sewage disposal facilities," the survey said.

Nine out of ten voters said the county must be concerned with controlling present growth patterns.

"When confronted with two statements regarding whether the present patterns of growth in the county should be maintained or controlled, 90 percent expressed their opinion that controlling . . . must be a matter of concern," the survey said.

Nine percent said available resources should be used to maintain present growth while 1 percent had no answer.

More than three out of four respondants said programs and available revenues should be used for the "maximum satisfaction" of current residents, while only 20 percent favored using money and programs to provide essentials for as many residents as choose to live here.

Phosphate mining and related processes were perceived as being "very detrimental" to the environment and they should be vigorously opposed until safeguards are provided. Sixty three percent said phosphate mining was "very detrimental," 23 percent said it was "somewhat detrimental," 8 percent chose "slightly detrimental," 5 percent said it was of "no consequence" and 1 percent had no answer.

A whopping 82 percent vigorously opposed mining and processing effects until assured protection is established, 13 percent expressed concern "only to a moderate degree," 4 percent considered it of "minor importance" and 1 percent had no response.

The questionnaire also asked for ratings on 19 issues which might apply to Sarasota County. Responses were based on a one to five point scale, with one strongly opposed and five strongly in favor. Some examples and typical answers:

—Restrictions on population growth. More than 58 percent said they strongly favored, 23.1 percent moderately favored, 8.4 percent neither favored nor opposed, 5.2 percent moderately opposed and 4.4 percent strongly opposed.

—Stricter assurance of adequate water suplies. Almost 90 percent strongly favored, 7.2 percent moderately favored, 1.7 percent had no opinion, 0.4 percent moderately opposed and 0.4 percent strongly opposed.

—Consolidation of some city-county services. Over 42 percent strongly favored, 25.9 percent moderately favored, 17.6 percent neither favored or opposed, 5.2 percent were moderately against and 8.4 percent strongly opposed.

— Stricter enforcement of zoning controls. Here 73.8 percent strongly supported, 15.4 percent moderately favored, 7.3 percent had no comment, 1.3 percent moderately opposed and 1 percent was strongly against.

—Legislation requiring service efficiency (water, sewer, electricity, etc.) before new housing projects are approved. More than 83 percent strongly favored, 9.3 percent moderately favored, 3.1 percent didn't feel either way, .7 percent moderately opposed and 1.2 percent strongly opposed.

—Stricter air pollution controls. Sixty percent were strongly in favor, 24.8 percent moderately approved, 11 percent neither favored nor opposed, 1.9 percent moderately opposed and 1 percent strongly opposed.

—More public beaches. More than 33 percent strongly favored, 23.4 percent moderately favored, 20.4 percent had no opinion, 6.2 percent were moderately against and 6.7 percent strongly opposed.

—Regulated annual rate of population growth. More than 60 percent said they strongly favored, 28.7 percent moderately favored, 10.3 percent were neither in favor nor opposed, 2.7 percent were moderately opposed and 2.0 percent were strongly against.

—Limiting local taxes. Almost 61 percent strongly supported, 23.2 percent moderately favored, 10.6 percent had no opinion, 2.6 percent were moderately opposed and 1.2 percent were strongly opposed.

—Limiting height of residential buildings. About 74 percent strongly supported, 12.1 percent moderately favored, 9.2 percent made no choice, 2.1 percent were moderately opposed and 1.7 percent were strongly against.

—County tax monies used for the purchase of land for environmental purposes. Here 45.6 percent strongly favored, 28.3 percent moderately favored, 13.4 percent neither supported nor opposed, 5.7 percent were moderately against and 5.8 percent strongly opposed.

—Stricter water pollution controls aimed at making Sarasota's bay waters suitable for shell-fish taking. More than 77 percent strongly favored, 14.2 percent moderately favored, 6.5 percent had no feelings, 0.7 percent were moderately against and 0.5 percent were strongly opposed.

Sarasota County has been given a one-year extension to submit its Comprehensive Plan to the state, which means the document is not due until July, 1980. County officials already have indicated they plan to take a hard look at the SOBA results.

SOBA has offered to further discuss the report with the commission or other county officials. Copies of the survey will be at the Selby Library for public use.

Reproduced from best available copy.

November 7, 1979

Environmental Protection Agency
401 M Street, SW
Washington, D.C. 20460

Dear Gentlemen:

This letter is in response to the Federal Register (44 FR 54870, September 21, 1979) concerning a proposed rule to limit particulate emissions from new, modified, and reconstructed phosphate rock plants.

As you may be aware, the environmental compatibility of phosphate enterprises in Florida is of deep concern to Florida Audubon Society and of direct interest to thousands of our members who live in close proximity to the central Florida phosphate producing area.

Exceptional air cleanliness is one of the assumed natural assets of our state. For many Florida citizens, the clean air is more than a pleasant amenity but is critical to survival.

Airborne particulates are a respiratory aggravation in general; but, even if the particulate, of itself, inert, it may carry carcinogenic substances absorbed to the particle surface; or the inert particle may "promote" malignancy in many cells that have been previously "induced" to a pre-malignant or neoplastic state.

Thus, we in Florida view your initiative to improve particulate emissions rates as being in our best interest and we urge you on.

I note with a sense of confidence that through "wet crushing" techniques, phosphate companies can achieve high standards in this realm of air pollution control without great duress. In fact, containing rock dust may be to the company's advantage: As I am often reminded, phosphate dust escaping the crusher represents a loss of "product", a loss of profit potential.

Clean air will benefit all elements of society.

Sincerely,
Archie Carr III, Ph.D. -- Special Assistant to the President

ACIII

tampa bay
regional
planning
council

9455 Koger Boulevard
St. Petersburg, FL 33702
(813) 577-5151/Tampa 224-9380

December 11, 1979

Mr. John E. Hagan, III
Chief, EIS Branch
Environmental Protection Agency
Region IV
345 Courtland Street NE
Atlanta, GA 30308

Dear Mr. Hagan:

Subject: TBRPC Clearinghouse Review No. 75-79; Duette Mine, Manatee County

Please find enclosed a copy of the final report on the above referenced project. I am also enclosing a copy of a transmittal letter from TBRPC for the unsigned final report. Signed reports are not accompanied by transmittal letters.

If you have any questions, do not hesitate to contact me.

Sincerely,

Ann M. Pytynia

Ann M. Pytynia
A-95 Coordinator

AMP/jls

Enclosures

Chairman Michael Ledbetter
Commissioner, Pasco County

Vice-Chairman Louis Driggers
Commissioner, Manatee County

Secretary/Treasurer Frederick Allen
Councilman, City of Gulfport

Scott D. Wilson
Executive Director

Bradenton • Clearwater • Dade City • Dunedin • Gulfport • Largo • New Port Richey • Oldsmar • Palmetto • Pinellas Park • St. Petersburg • Sarasota • Tampa • Tarpon Springs

Hillsborough Manatee Pasco Pinellas Counties

Rec'd 12/3/79
File 3-4-6
2-4-1

CH Review #75-79; Duette Mine EIS, Manatee County

The United States Environmental Protection Agency in Atlanta has submitted an Environmental Impact Statement for the Estech General Chemical Duette Mine in Manatee County.

Local Comments

Manatee County Planning Department: No comment as of November 21, 1979.

Council Comments and Recommendations

This document was found to be regionally significant and consistent with TBRPC goals and objectives. The adopted Future of the Region states that it shall be one policy of the Council to preserve and restore natural lands. The EIS was also found to be consistent with the Council's criteria described in the Areawide Water Quality Management Plan and the Development of Regional Impact report compiled by the Council in November, 1978. Estech Corporation should be commended for committals expressed in terms of current technological alternatives in the areas of reclamation. There are no objections to the EIS.

Committee adopted November 26, 1979.

Louis E. Driggers

Commissioner Louis E. Driggers, Chairman
Clearinghouse Review Committee

Please note: Unless otherwise notified, action by Clearinghouse Review Committee is final. Append copy to application to indicate compliance with clearinghouse requirements. Comments constitute compliance with OMB Circular A-95 only.

November 14, 1979

Mr. John E. Hagan III
Chief, EIS Branch
Environmental Protection Agency
Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30308

Dear Mr. Hagan:

Subject: TBRPC Clearinghouse Review No. 75-79; Duette Mine, Manatee County

Please find enclosed a copy of the unsigned final report on the above referenced project. This project will be reviewed by the Council's A-95 Clearinghouse Review Committee at 8:30 a.m., November 26, 1979 at the Council offices.

If you should have any questions, do not hesitate to contact me.

Sincerely,

Ann M. Pytynia
A-95 Coordinator

AMP/pkw

Enclosure

NOV 4 1979

Company FERTILIZERS & AGRICULTURAL CHEMICALS
P. O. DRAWER 1940 · NORFOLK, VIRGINIA 23501 · TELEPHONE 804, 622-4783

RONALD L. JONES
Corporate General Counsel

December 7, 1979

Mr. John E. Hagan III
Chief, EIS Branch
United States Environmental Protection Agency
Region IV
345 Courtland Street, N. E.
Atlanta, Georgia 30308

RE: EPA 904/7-79-044. NPDES Application Number: FL 0036609
Draft Environmental Impact Statement for Proposed Issuance of a New Source National Pollutant Discharge Elimination System Permit to Estech General Chemicals Corporation, Duette Mine, Manatee County, Florida

Dear Mr. Hagan:

Please find and consider the attached comments from the Royster Company with respect to the Draft Environmental Impact Statement referenced above.

Since Royster intends to be a joint venturer in the Duette Mine project so that we can replace our existing source of phosphate rock due to expire in 1983, we have a vital interest in a favorable Environmental Impact Statement.

Please contact Mr. Robert W. Heinz at our Mulberry, Florida plant or me if we may be of assistance.

Very truly yours,

RLJones

Ronald L. Jones

RLJ/aft
Enclosure

TO: United States Environmental Protection Agency
Region IV
345 Courtland Street
Atlanta, Georgia 30308

FROM: Royster Company
P. O. Drawer 1940
Norfolk, Virginia 23501

COMMENTS RE: EPA 904/7-79-044. NPDES Application Number: FL 0036609
Draft Environmental Impact Statement for Proposed Issuance of a New Source National Pollutant Discharge Elimination System Permit to Estech General Chemicals Corporation, Duette Mine, Manatee County, Florida

Royster Company emphatically supports the Draft Environmental Impact Statement published in October 1979 by the Federal EPA which was favorable to the proposed Estech Chemicals Corporation's Duette Mine project to be located in Manatee County, Florida. In our opinion, the proposed mining and reclamation plans contain creative and effective environmental safeguards which enhance the short and long-term socio-economic, agricultural and natural vegetation impact.

For more than forty years, Royster has maintained a significant investment in land and people in the phosphate industry in Florida. The Duette Mine project, in which Royster intends to participate as a joint venturer, is essential to the replacement of our company's current source of phosphate rock which expires July 1, 1983. This replacement will act to maintain the net capability of the U. S. phosphate industry, thereby helping to ensure a stable supply of one essential crop nutrient so that the United States will not need to rely upon imports from overseas. Indeed, this phosphate production and the resulting food crops are essential contributors toward a favorable balance of payments for the United States.

RESPONSES TO WRITTEN COMMENTS

RESPONSE W-1

This comment is certainly correct when energy is viewed from a strictly domestic perspective, and the current national energy situation provides considerable incentive to adopt such a perspective. However, due to the complexity of existing international agreements and trade arrangements between the United States and other countries, especially allies such as Japan, it becomes practically impossible to divorce the domestic and world energy issues. Even viewed from a world energy perspective, more energy is consumed to dry the rock than is consumed to ship the moisture in the wet rock. On the other hand, if the rock is dried at the final destination, the energy consumed in drying the rock is added to the energy consumed in shipping the moisture, resulting in the greatest overall world energy consumption.

Although the dryer capacity and resulting emissions are projected for the <u>total</u> output of the proposed mine, Estech will, in fact, send wet rock to those customers which can accept it. Estech will dry rock for customers requiring dry rock at the final destination, a procedure which is more efficient from a world energy perspective than drying rock at the final destination.

RESPONSE W-2

This point is well taken. The Central Florida Phosphate Industry Areawide EIS does not present economic considerations or market conditions as possible justifications for permitting new rock dryers. The important fact which should, more correctly, have been emphasized in the Estech DEIS is that the Areawide EIS recommendation concerning rock drying was mitigated by more recent developments. The recommendation to eliminate rock drying was premised on the then existing allowable source emission rates which were significantly greater than rates now permitted by EPA's PSD Regulations. The deciding issue now is that the dry rock production can be achieved in compliance with appropriate

regulations regarding maintenance of air quality. Discussion relevant to this point may be found on pages 169 and 170 of the DEIS and on pages 3 and 4 of the Air Quality Resource Document.

RESPONSE W-3

The arguments presented for postponing the Final Environmental Impact Statement (FEIS) until after the local land use issue is resolved have received serious consideration. However, EPA feels that the publication of a FEIS can and should provide useful information that can be used by appropriate state and local officials in their decision making process. Certainly EPA's actions cannot supersede or preclude actions by other jurisdictional entities including local government. Regarding the practicalities of the situation if the project is altered in a substantial way, a supplement to the FEIS can be prepared. Before EPA issues the NPDES permit, a permit hearing will be held and state certification under Section 401 must be obtained. EPA will assure that the action it takes on the NPDES permit does not undermine the integrity of local land use decision process.

RESPONSE W-4

See Response W-2.

RESPONSE W-5

See Response W-1.

RESPONSE W-6

The U.S. EPA Office of Planning and Management recently investigated availability of low sulfur fuel oil, and while cost differentials between high and low sulfur fuel are expected, there is no indication of a shortage of low sulfur fuel oil projected through the Winter of 1980 - 1981. In fact, slight increases in supply and concomitant reductions in use have increased the availability of low sulfur fuel to the extent that prices actually decreased somewhat in early 1980. Iranian

supplies were interrupted well before 1980. Consequentially, guidance has been issued to all EPA Regions recommending disapproval of future requests for Section 110(f) waivers (Clean Air Act Amendments, 1977) except in the event of any major reduction in oil supplies.

Supply requirements of low sulfur fuel oil for the referenced electric utility are projected to be approximately 40 million barrels for 1980, contrasted with a projected 0.28 million barrels required annually by the proposed activity.

It is reasonable to expect that at times it may be difficult to secure guaranteed commitments for the large fuel quantities necessary for uninterrupted and legal operation of a major electric power utility, while smaller quantities may remain available for relatively few moderate industrial users.

Future availabilities and costs of low sulfur fuel oil were important considerations in development of the rock dryer pollution control system design. While the proposed operation is presently constrained by local regulations to use low sulfur fuel oil (1.0 percent maximum), future allocations of available supplies of low sulfur oil to other parts of the nation was recognized as a possibility. The manufacturer of the control device was required to submit a system design capable of approximately double the maximum inlet loading contributed by 1.0 percent sulfur fuel oil. Hence, the stack emission rate of sulfur dioxide may be controlled at the present estimated levels for fuel oils containing at least 2 percent and possibly as great as 2.5 percent sulfur. (See also Response W-7.)

Finally, modeling analysis of source effects indicates that other major contributors to the sulfur dioxide concentrations at critical receptor locations were diesel powered earth moving equipment associated with transient mining and reclamation activities and the 100 horsepower package steam boiler. If the component contribution from rock drying were increased by an amount equivalent to the difference between 1.0 and 2.5 percent

fuel sulfur at the control system efficiency stated in the DEIS, the sum of concentrations contributed by all three sulfur dioxide sources would increase only in proportion to the dryer contribution and would not exceed the PSD levels of significance at existing critical receptor locations.

RESPONSE W-7

The Air Quality Resource Document (pp. 20, 33 & 35) indicates that substantial quantities of sulfur dioxide are removed in the fluidized bed reactors (dryers) before gases enter the control equipment. The industrial oil-fired boiler analogy is introduced to convey that the overall removal, inherent plus deliberate, will be equivalent to 96.5 percent. Thus, the 96.5 percent efficiency cannot be compared directly to control system performance on steam, electric power generation boilers. Necessary documentation is included in PSD Construction Permit Applications filed with the EPA, and the appplications are initially referenced in the Air Quality Resource Document (p. 7). The supporting documentation for sulfur dioxide consists of two separate equipment proposals, each including the willingness of a responsible supplier to guarantee system performance greater than the indicated 96.5 percent removal efficiency.

The state-of-the-art of technological development in flue gas desulfurization (FGD) has continued to progress since 1976 - 1977. The EPA Industrial Boiler FGD Survey: First Quarter 1979 (EPA 600/7-79-067b), describes a more recent state of applied technology and indicates that several sodium hydroxide (primary cycle) systems are effectively achieving 90 percent sulfur dioxide removal, and some have even demonstrated removal capabilities as great as 96+ percent (Alyeska Pipeline Company) with relatively problem-free operation. The report also describes several systems with design removal efficiencies in the 94-96 percent range that were planned or were in construction at the time the report was published (April, 1979). It is likely that many of the existing systems would be capable of operation at greater than 90 percent removal efficiency if it were not

for the fact that current regulations do not require better performance. It is reasonable to expect that in designing a new, high performance system, a control system manufacturer would not rely on designs that have resulted in poor performance, but would instead attempt to avoid many of the mostly mechanical pitfalls that were responsible for poor operating reliability in the earlier control system designs. In view of the above and the fact that the proposed control devices effectively include two separate gas removal stages, a venturi scrubber (capable of alkali injection) followed by a three-stage alkali spray absorption chamber, the 96.5 percent overall removal efficiency estimate is realistic, rather than optimistic.

Removal efficiencies for other pollutants are similarly documented in PSD Permit Applications filed with the U.S. EPA, and the applications are initially referenced on page 7 of the Air Quality Resource Document in the section where estimation methodologies are described.

RESPONSE W-8

Refer to Responses W-6 and W-7.

RESPONSE W-9

The computational (factoring) procedure utilized to generate sulfur dioxide concentrations is a commonly practiced and mathematically rigorous procedure and produces results identical to those which would have resulted if the computer algorithms (models) had been exercised directly with the sulfur dioxide source emission data. The techique was reported to clarify the absence of computer results in the Appendix.

RESPONSE W-10

The "relaxed" standard is a (temporary) Variance from the Florida State Implementation Plan which expires October 18, 1981. The variance was granted well after completion of the DEIS analysis and will expire before the proposed project can be constructed. It is predicted that the State Implementation Plan requirements

will be resumed upon expiration of the Variance, and the DEIS analysis for the proposed facility would be unchanged.

RESPONSE W-11

It is agreed that at some location the described power generation facility produced concentrations in excess of significance levels as a consequence of the temporary variance discussed in Response W-10. EPA does not specifically include "significant source" among PSD definitions, but instead utilizes significance level criteria to evaluate effects contributed by a proposed source. The proposed source considered in this instance is the Estech General Chemicals Corporation mining facility. (See also Response W-12.)

RESPONSE W-12

The DEIS states "other major source development in the immediate area of the proposed mine" and refers only to new or modified sources having substantial effects near the proposed project property boundaries. Monitoring data suggest that the referenced power generation station effects would not be substantial at the proposed site even with the change to high sulfur fuel. If the referenced power generation station were to undergo a permanent modification, that change would require revision of the State Implementation Plan and would initiate the requirement for a complete interactive PSD review essentially similar to that conducted for the proposed facility. At that time emissions from the power generation facility would be constrained from exceeding the remaining PSD increments and NAAQS.

RESPONSE W-13

Refer to Response W-10.

RESPONSE W-14

The essential input and procedural information to determine accuracy of the analysis and approach was furnished to EPA. Information included is that which EPA determined to be necessary

and is presented in the Air Quality Resource Document Appendix. Minor omissions of data were discovered and are included as errata to the Resource Document located in the Errata Section of the FEIS.

The interactive sources are referenced to UTM coordinates and can be identified from NEDS or FDER listings. Each computer run included a title relating the run to the objective or element of PSD analysis discussed in the test. CRSTER, AQDM and PTMTP-W input-output are decipherable by individuals with modeling background adequate to interpret the results and are available in User's Handbooks available from the National Technical Information Service of the U.S. Department of Commerce. Inclusion of detailed information sufficient to reconstruct the entire air quality analysis would have involved the printing of a cumbersomely voluminous document.

RESPONSE W-15

The alternative of using the existing dryer at Estech's Silver City Mine was included as a part of the analysis of using an "Existing Dryer at Remote Location". At the time the DEIS was published, this investigation had led to the following conclusion, found on page 50 of the Alternative Evaluation Resource Document: "More significantly, there are no known existing facilities in Central Florida with excess capacity for contract drying three million tons per yer of phosphate rock." This statement applied to Estech's facility as well as other companies' facilities. The capacity of the Bartow (Silver City) rock dryer of approximately three million tons per year was being fully utilized, with two million tons per year coming from the Silver City Mine and one million tons per year from the Watson Mine. The Silver City Mine is currently nearing depletion, while the Watson Mine will continue producing one million tons per year until the mid 90's. Even with the cessation of mining at the Silver City Mine, the Silver City rock dryer operating at full capacity could not handle the combined production of the Watson and Duette mines.

Since the publication of the DEIS, Estech has reduced the tonnage of Duette rock to be dried by actively encouraging its partners to accept wet rock. At this writing, Royster and Estech have indicated they would take up to 990,000 tons of wet rock each year (or about 30% of the Duette Mine production). This leaves approximately two million tons of Duette rock to be dried. It could, in the near future, be marginally possible for the Silver City rock dryer to handle the combined requirements of the Watson and Duette mines. There is no economic incentive for Estech to adopt this as their proposed action. Operating (drying and shipping) costs would increase by 30% and 36% respectively, if the wet rock were either hauled by truck or shipped by rail to the Silver City dryer, then dried and shipped to the customer. Nor is it advantageous from an environmental viewpoint. Additional energy would be consumed in shipping the wet rock to the Silver City Mine. More importantly, it would prolong the use of the older, less efficient rock dryer, which is currently scheduled for decreased utilization at one million tons per year until the Watson Mine is exhausted, at which time it will cease operation altogether. As explained previously in response to Comment W-2, the Clean Air Act Amendments have provided a mechanism to ensure that the new rock dryer emissions will be a considerable improvement over those still allowable with the existing rock dryer.

It is reasonable to expect that over the life of the project Estech will continue efforts to reduce as much as possible the tonnage to be dried, for several reasons: drying consumes capital; drying consumes energy; drying does not produce a return other than being able to meet the customer requirements of dry rock.

RESPONSE W-16

As in the DEIS, definitive information regarding the water quality of the waste clays at the Estech Duette Mine is not available as wastes have not been generated at the site. However, information regarding the water quality in a clay

storage area of an existing mine in Hillsborough County, Florida, has been used to attempt to provide some quantative projections of effects on the surficial groundwater quality. Analysis of a water sample collected from a clay settling pond at the Hillsborough site indicates that the water meets the EPA primary and secondary drinking water standards for all constituants analyzed except iron. The chemical characteristics of the water in the Estech clay storage area are expected to be similar.

The chemical character of the water at the sampled clay settling pond is similar to the samples collected from existing shallow wells at the Estech site. It is therefore believed that the clay storage area will not adversely affect the water quality in the surficial deposits.

RESPONSE W-17

Reading of the explanatory paragraph immediately following the quoted recommendation is pertinent to Estech's case and reveals that Estech is, in fact, following the Areawide EIS recommendation: "The mining and reclamation plan for new-source mines should establish a method whereby the slimes (or slimes/tailings mixture) would be used for reclamation or some other purpose. The need for an initial aboveground storage area is recognized - as is the need for small retaining dikes around certain areas. If the percentage of waste clay at a mine exceeds the proportionate amount that can be utilized, the incremental amounts beyond that which can be handled by new slime - dewatering methods may be placed in a holding pond for reclamation after settling." The single 480-acre clay settling area is mandatory if Estech is to employ the recommended slimes/tailings mixture technique. This area must receive all the clay wastes generated before the sand-clay mix procedure becomes operational. It is necessary that this initial settling area remain active over the life of the mine to be available to receive clay wastes in the event of a temporary breakdown of a mechanical thickener at the plant or of some other technical

difficulty which would temporarily halt the sand-clay mixing procedure. Moreover, although the Duette Mine ore contains on the average more sand than required in the sand-clay mix, in any given mining block or at any given point in time, the waste clay generated may exceed the amount that can be immediately utilized. The initial settling area would be needed to receive these clay wastes in excess of the sand/clay mix requirements.

RESPONSE W-18

Conventional waste clay disposal, as described in the Areawide EIS, involves "large settling areas covering 30-60% of mined lands requiring 5-20 years for reclamation to support agricultural uses". This disposal method was discussed as a project alternative on pages 31 and 32 of the Alternatives Evaluation Resource Document. This option would necessitate committal of 7,104 acres to 10,121 acres of the site to waste disposal, depending on dam height. The non-conventional alternative of mixing sand with waste clay in mined-out (incised) pits was also discussed within the Resource Document. This sand/clay mix alternative, which was the recommended alternative of the DEIS, involves a total of 6,754 acres and substantially reduces the chances of a significant environmental disaster by eliminating the need for aboveground storage except for an initial above groundstorage area. As recognized in the EPA Areawide EIS, an initial aboveground storage area on natural ground is necessary at mine start-up and for some period afterward until mined-out cuts become available for waste disposal.

RESPONSE W-19

The plan for diversion of 3 mgd from the East Fork Manatee River will not be affected by the fact that the East Fork of the Manatee River. The Reservoir is proposed to be located adjacent to the floodplain of the East Fork and the intake structure will be constructed to provide the 3 mgd from the river to the reservoir. The Terms and Conditions of the Consumptive Use Permit granted by the Southwest Florida Water Management District

require that water be provided to the storage basin via withdrawals from the East Fork. The "Terms" further require that the applicant decrease its groundwater withdrawals by withdrawing water from the reservoir.

RESPONSE W-20

The primary water management plan evaluated in the DEIS was based on an order granting a permit by the Southwest Florida Water Management District after a public hearing before the District Governing Board. The plan encompassed a balance between groundwater withdrawals from wells within the Floridan Aquifer and, commencing with the fourth year of mining, diversion of surface water from the East Fork Manatee to a surface water storage basin constructed by Estech. (See also Response W-19.) By terms of the permit, Estech must maintain minimum monthly flows downstream from the diversion to "minimize the impact of the diversion and permit the public interest to be safeguarded".

RESPONSE W-21

Biological and hydrological effects of mining activities in wetlands were addressed in the Draft Environmental Impact Statement (pp. 129, 131, and 180) and in the accompanying Resource Document on Biology.

Category 2 wetlands can be contiguous to Category 1 wetlands whereas Category 3 wetlands are isolated. It is true that disturbing Category 2 wetlands will have a detrimental effect on downstream Category 1 wetlands by diminishing surface flows, lowering water quality and eliminating a portion of detrital input to downstream systems. However, these effects will be temporary and will decrease in magnitude with time after reclamation. In addition, EPA has placed 25% of Category 2 Headwaters and Tributary Wetlands in Category 1. The purpose were to provide a buffer zone between mined Category 2 areas and unmined Category 1 areas, and to provide an established, natural corridor for recolonization of upstream reclaimed Category 2 areas.

RESPONSE W-22

The cited 5.4 mgd reduction in flow of the East Fork Manatee River during mining (DEIS, page 80) is an annual average. This figure cannot be directly compared with average monthly extreme flows (minimum-maximum) for an eight year pre-mining period (DEIS, page 77). Post-mining flow modifications for all affected basins are presented in comparable units on pages 80 and 81 of the DEIS.

RESPONSE W-23

Sixty-eight percent of the sand pine scrub habitat and the entire 18-acre cypress dome will be preserved. The alteration of the land surrounding the sand pine scrub community may lower its wildlife value. However, the rare, threatened or endangered species which inhabit sand pine scrubs have limited home ranges and therefore should not be severely impacted by a loss of surrounding habitat. A buffer zone around the preserved areas should minimize harm to the preserved areas. Important wetland habitats will be protected. All mainstem streams and their floodplain swamp have been placed in Category 1, i.e., preserved. Mining in swamps will be limited to tributaries to mainstem streams and isolated bayheads. In addition, 25% of headwater and tributary wetlands (Category 2) will be preserved as Category 1. (See also Response W-21.) All Category 2 swamps will be restored after mining.

RESPONSE W-24

Species listed as rare, threatened or endangered presently make little use of the site. With few exceptions, individuals of these species will continue to occupy those habitats which will not be disturbed by mining operations (e.g., floodplain swamps) or will be able to move to suitable, nearby habitats. As a group, the listed species are not expected to show significant population declines. Some listed species, such as alligators and wood storks, will probably benefit from the creation of mine-pit lakes. It is possible that bald eagles and ospreys

(which are not known to use the site now) will be attracted to the lakes. Gopher tortoises are common on formerly mined lands and may be expected to recover to their present population.

Please see Response W-76 for information concerning EPA's compliance with the Federal Endangered Species Act, which has resulted in the issuance of a "no jeopardy" Biological Opinion by the U.S. Fish and Wildlife Service. The Endangered Species Coordinator of the Florida Game and Fresh Water Fish Commission has reviewed the DEIS and the proposed action for compliance with State of Florida endangered species laws and has offered no adverse comment. He has also participated in the Federal consultation process.

RESPONSE W-25

The Clearing House Review Committee of the Tampa Bay Regional Planning Council found the DEIS to be "regionally significant and consistent with TBRPC goals and objectives" (November 26, 1979). Special protective efforts which will be undertaken by Estech are discussed in Response W-76.

Response W-26

In compliance with Section 7 of the Endangered Species Act, the Department of the Interior was consulted concerning the adequacy of the biological assessment, and their Biological Opinion was requested. See Response W-76 for full discussion.

Response W-27

Identification of unique and endangered species present on the proposed site was carried out as part of the EIS process. Steps being taken by Estech to protect identified species are described in correspondence included in Response W-76.

RESPONSE W-28

It is believed that due to the expected reduction in permeability of the sand/clay mix, relative to the existing surficial deposits, the recharge capacity of wells located near or in

these areas will also be reduced. The actual (quantitative) value of this reduction will not be known until field testing begins following the initiation of mine operations. The consumptive-use permit (SWFWMD, 1978), however, requires a certain quantity (3.04 mgd) to be recharged regardless of any changes in the permeability of the surficial materials.

The proposed Manatee County Comprehensive Plan generally calls for long-range land uses which are predominantly "rural in nature".

RESPONSE W-29

The fractionation of the elements of the uranium decay series does occur within a chemical plant and this phenomenon is well documented in the open literature. Radium-226 chemically associates with the gypsum ($CaSO_4/RaSO_4$) due to the fact that both are divalent cations and the uranium remains soluble in the phosphoric acid. The Duette Mine does not include a chemical plant, only a beneficiation plant and dryer.

The beneficiation process is a physical separation which should represent an extreme attempt at an aqueous leaching of the radioactive species from the major components of the phosphatic matrix. Yet the published data suggest little enrichment or leaching in any of the components: sand, clay, rock or concentrate. The reader is especially referred to the recent publication by Roessler, et al, Health Physics Vol. 37, p. 269 - 277, September, 1979.

RESPONSE W-30

As stated in the response to Comment W-29, the beneficiation process has not been shown to produce soluble uranium since the process is physical rather than chemical. EPA's Environmental Impact Statement on the Central Florida Phosphate Industry considered the potential for groundwater contamination in some detail. The data were not demonstrative of an impact of current

mining; in fact, the data suggest higher radioactivity levels in the unmined areas.

It should be re-emphasized that the radioactivity in the minable matrix is a small fraction of the total radioactivity (uranium and daughters) found in the Hawthorne formation. The fact that the aquifers underlying this formation are low in radioactivity is strong evidence for the insolubility of these radioactive species within this type of sedimentary mineral.

RESPONSE W-31

Uranium-238 was included (page 67, Radiological Environment Resource Document). The manner of listing was sequenced in order of their relative contribution to the off-site dose, rather than the usual sequencing by parent, daughter, granddaughter, etc. Radium-226 is listed first because it is considered to be the highest contributor to the off-site dose to man.

The comment suggests that Pb-210 be added to the list of radionuclides of concern, then modifies this concern by the suggestion that it is the daughter product, Po-210, an alpha-emitter, that may lead to serious health effects. Po-210 was considered by the AIREM model. The beta-emitting Pb-210 will be much less a hazard than the alpha-emitting Po-210 which was included in the analyses.

RESPONSE W-32

The comment refers to the radionuclides of U-238 and Pb-210. The potential for uptake of Ra-226 was addressed in the report. Since Ra-226 is considered to be the most critical radionuclide in terms of the series of parameters involved in modeling its transport from soil to human, the many other radionuclides that could be addressed will be subordinate to Ra-226. The limited impact predicted for Ra-226 suggests further analyses to be unnecessary.

The term "fertilizer production" in the comment again suggests a possible concern for the total generic problem of the industry,

including chemical plants and the end uses of fertilizer. The Duette site will produce airborne particles and there will be provision for an air monitoring network once the on-site dryer goes into operation. Specific radionuclide analyses may be performed if gross alpha/gross beta screening justifies a potential hazard.

RESPONSE W-33

The question, as in W-29, confuses data on end-product fertilizer with the raw material produced by the Duette complex. The concentrate and pebble from the Duette site may be used for a variety of purposes, including manufacture of phosphoric acid at some other site. In any off-site chemical processing of phosphate ore, the uranium will definitely be solubilized. The various uranium extraction operations coming on line in Florida are a direct result of this phenomenon. If the uranium is not extracted from the phosphoric acid and the phosphoric acid is utilized in any commercial end-product, such as triple superphosphate, then that product will contain the soluble uranium to which Spalding and Sackett refer. This problem is generic to the entire industry and has no direct impact on the Duette complex. As more and more of the total phosphoric acid produced is processed for uranium extraction, the leachate off of farmlands becomes less and less. EPA's Environmental Impact Statement for the Central Florida Phosphate Industry recommended a maximum utilization of this resource recovery technique.

RESPONSE W-34

As in previous comments by the same author (W-29 through W-33), the concern relates to the total industry and has little direct bearing on the specific impact of mining, beneiiciation and drying of ore at the Duette site. The impact of a proposed water standard for uranium would be most evident at a chemical plant where the uranium is solubilized into the phosphoric acid or in a process where phosphoric acid is utilized, i.e., triple

superphosphate production. A chemical plant is not a component of this project.

The discussion within the comment implies a drinking water standard at 10 pCi/l soluble uranium. The long standing Maximum Permissible Concentration in water for soluble uranium has been 40,000 pCi/l for the population. Justification for lowering this established standard by over three orders of magnitude would be a most significant undertaking. EPA is the lead agency in setting radiation protection standards and will continue to address this problem.

Effluent guidelines and drinking standards are, of course, not necessarily the same. Consideration of discharge, dilution, dispersion, uptake, sedimentation, exchange, and removal efficiencies by water treatment processes are typical of transport phenomena that must be considered in an effluent standard.

RESPONSE W-35

This discussion continues to address the question of the proposed water standard for uranium and its ultimate distribution in bone. As mentioned in Response W-34 and W-36, EPA's Office of Water Programs will consider many physical and biological factors in establishing radiation standards in water. Among these are intake quantities, biological transfer, transport to critical organs, nature of the organ, dose response, biological and physical half life of the dose radionuclide and elimination rates.

RESPONSE W-36

It is not cost-effective to develop standards for all radioisotopes which may appear in drinking water, and for the present time, there are no plans for a Pb-210 standard. Alpha emissions from Po-210 are adequately covered under the gross alpha limit of 15 pCi/l.

A radon in drinking water standard is under consideration by the EPA Office of Water Programs. If developed, it is at least two to three years from promulgation.

RESPONSE W-37

It is agreed that the 0.020WL total exposure to radon progeny does represent a definitive cancer risk. However, the "3,000 excess lung cancer deaths per 100,000 people" cited represents an upper limit figure, and consequently, it may be more appropriate to use a 1,000 - 3,000 cancer death range per 100,000 people as stated in the referenced EPA document (EPA 520/4-78-013).

With respect to radon progeny producing a "large increase in skin cancer risks", the EPA/ORP position is that there is poor evidence to support this conclusion.

RESPONSE W-38

The Spalding and Sackett reference does have a typographical error in the date. The exact reference should be as follows:

> Roy F. Spalding and William M. Sackett, "Uranium in Runoff from the Gulf of Mexico Distributive Providence: Anomalous Concentrations", Science Vol. 175, pp. 629-631, February 11, 1972.

Spalding and Sackett state that "from an analysis of corn, soybean, and alfalfa grown under varying applications of P_2O_5, it appears that very little, if any, uptake of uranium occurs." They also calculate the total applied uranium per year in the area of interest divided by the annual expected runoff and find that value agrees well with the measured incremental increase of uranium in the waterways. Thus, the paper indicates little impact of the soluble uranium other than its transfer to the waters of the Gulf of Mexico where the natural concentrations of uranium are higher than in freshwater streams of their study area.

RESPONSE W-39

Comment W-39 is a modification of Comment W-29. Please refer to Response W-29 for the appropriate response.

RESPONSE W-40

This comment is a slightly modified combination of Comments W-31 and W-32. Refer to Responses W-31 and W-32 for the appropriate response.

RESPONSE W-41

This comment is a modified quotation of Comment W-33, except that 'assumed' has been changed to 'assured' and the word 'and' in the last sentence has been underlined for apparent emphasis. Also 'high concentrations' in the third sentence has been changed to 'light concentrations'. Please refer to Response W-33 for the appropriate response.

RESPONSE W-42

Comment W-42 is primarily a direct quote of Comment W-34. Please refer to Response W-34 for the appropriate response.

RESPONSE W-43

Comment W-43 is primarily a direct quote of Comments W-34 and W-35. However, the next to the last sentence should read, "For chronic exposure, <u>is</u> the uranium distribution in human bone similar to that of Ra-226 or that of Pu-239?" Please refer to Responses W-34 and W-35 for the appropriate response.

RESPONSE W-44

See Response W-36.

RESPONSE W-45

See Response W-37.

RESPONSE W-46

The dryers and associated dry rock handling facilities are projected to emit particulates at a rate not to exceed 126 tons per year, not 1,290 tons as shown in the comment. The rate of Ra-226 released from the two dryers is about 3.6 millicuries (3,600,000,000 picocuries) per year or about 3.6 milligrams of radium per year.

The expression "exceeds the equivalent radionuclides which would be allowed by NRC from a 1,000 megawatt nuclear power plant" is not applicable. The comparison between releases of one radioactive species and another can not be made on a picocurie basis. The curie unit has limited relationship to hazard. The comparison can only be made in terms of a transport model that leads to an analysis of a potential radiation dose from a set of given radionuclides to a defined population.

The document in question attempts to accomplish this analysis by adapting a computer code designed for the nuclear industry to the rock dryer emissions. The model incorporates emission rate, stack height, wind speed by direction and stability class, wind rose data by stability class, deposition, rainfall, distance, direction, and dose conversion, factors for the expected critical organ. Lung doses, thus calculated, were shown to be quite low for the off-site population - on the order of one-one thousandth of natural background rates.

For comparative purposes, the total yearly emission rate for Ra-226 given for the dryers is about equal to the naturally occurring Ra-226 in the first foot of a five-acre garden in a low background area of the state. For regions where the Hawthorne formation outcrops, the area of comparison may be less than one acre. The atmospheric dispersion calculated by the computer model indicates an insignificant off-site buildup of radionuclides in the soil.

RESPONSE W-47

The concern for uptake of radionuclides by fish and other wildlife in reclaimed lakes is related to the question of solubility expressed in previous comments. Responses W-29 through W-34 have attempted to address concerns such as (1) the solubility of uranium; (2) the difference between the mining/beneficiation/drying at the Duette Site and the production of fertilizer; and (3) the question of uptake. Response W-38 also addressed the uptake question. The report in question, Radiological Environment Resource Document, considers uptake on reclaimed lands on pages 73 through 77.

One additional consideration can be added to the aforementioned discussion. Natural systems and other activities of man have produced exposure of the below surface, high concentrations of radioactivity in central and west central Florida. Stream beds intercept the leached zone, the matrix or deeper Hawthorne strata. Dam and reservoir construction have potentially exposed recreational and public raw water supplies to new strata with elevated concentrations of radioactivity. Dredge and fill operations, including canal construction, have similar potentials. Failure of dams for clay settling areas have been known to contaminate large stretches of stream beds for a short period of time. All available evidence suggests that land-and-lake reclamation can provide safe water areas for fish management and recreational uses.

RESPONSE W-48

The impact of the mining operation on the alteration of terrestrial gamma radiation and the agricultural use of reclaimed land use was discussed in the DEIS on pages 113 and 115 respectively. As far as radiological impact is concerned, no data indicate a permanent loss of the land to agricultural use.

RESPONSE W-49

The technology for the creation of wetlands has been the subject of an annual conference entitled "The Restoration and Creation

of Wetlands" sponsored by the Hillsborough Community College Environmental Studies Center in Tampa, Florida, for the past six years. This conference, and a number of other ones like it throughout the country, have been the forum for presentation of many technical papers on demonstrated wetland restoration/creation projects. Although these conferences have dealt primarily with coastal wetland systems, two papers were presented at the 1979 Tampa conference on wetland reclamation technology in the central Florida mining district. These papers have indicated some initial success in creation of herbaceous wetland habitat. Storing the organic surface layer of freshwater ponds, and spreading this "seed source" in newly created depressions, shows promise of allowing rapid revegetation of a diverse wetland community. We share your concerns about successful restoration of hardwood swamp wetlands. We are allowing mining in Category 2 wetlands and are requiring restoration of these areas. Hopefully, this will generate useful data on restoration methodologies for swamp and bayhead construction.

RESPONSE W-50

Mining will result in a complete restructuring of soil profiles and, in many instances, significant modifications of soil characteristics in reclaimed areas. See pages 49, 50, 62, 63, 80 and 81 of the DEIS and page 18 of the Soils Resource Document regarding the projected alteration of surface drainage patterns, surface flows and vertical recharge due to mining induced soil structure modifications.

RESPONSE W-51

It is standard practice when reviewing a new or modified major source, such as the one Estech is proposing, to ascertain the types and numbers of emission points and the quantities of pollutant emissions from each point in order to properly conduct and/or review an ambient air quality impact analysis. The emissions inventory (computer input) and procedural information necessary to determine accuracy of the analysis and approach

were furnished to EPA. During the course of an EPA prevention of significant deterioration (PSD) review, the New Source Review Section of separate authorized engineering contractors assure that both quantity and quality of pollutant emissions are representative of the specified polluting facility. EPA's Preliminary Determination for Estech's PSD permit is contained in Appendix A-2 of this document.

RESPONSE W-52

Refer to Responses W-51 and W-54.

RESPONSE W-53

With regard to the accuracy of the input data, the reader is referenced to Response W-51 and W-52. There is apparent confusion exists on the part of the commentor because of the statement which questions the reliability of the AQDM computer model and further references a portion of the DEIS which pertains to the PTMTP-W model.

The question does not differentiate short-term (24-hour) and long-term (annual) modeling recognizes that the uncertainty arises from addition of an uncertain background estimate to an industrial contribution determined by modeling methods. In general, the results of any computer model are only as reliable as the assumptions and values of variables utilized for input to the model. Again, such items underwent close scrutiny during the required PSD review for the proposed source. (See Appendix A-2.) While the background concentrations added to the AQDM and PTMTP-W model results may not be exact, they do appear to be within the range of typical background measurements for the area and time-averaging periods under consideration.

RESPONSE W-54

All external, interactive air pollution sources with valid construction and/or operating permits within a 50 kilometer radius were considered and treated in the total suspended particulate modeling exercises which examined conformance with

available PSD increments and NAAQS (DEIS, pp. 33, 39 & 42). Emissions of other pollutant forms were determined to produce effects less than the PSD (deminimis) levels of significance and were exempt from external, interactive source modeling analysis (DEIS, p. 42). Other proposed mining operations, or any other future operation which has not yet filed or been granted a permit to construct a source of air pollution, will be similarly required by PSD regulations to examine source interactions with all new and existing permitted facilities at the time of application to insure that the PSD increments will not be exceeded. The U.S. Congress established the PSD increments as bounds on the degree of air quality deterioration which may be considered insignificant, and as limits, which may not be exceeded (Clean Air Act Amendments of 1977).

RESPONSE W-55

The actual design hourly consumption of electricity for the proposed facility is approximately 51,000 kilowatts/hour. Hourly generation capacity of the Manatee Electrical Power Generating Station is 1,700 megawatts. Consequently, the proposed activity nominally requires 3.0 percent of the total generation capacity of the FP&L Manatee Power Station. If power were supplied by the Manatee Power Station all times of the day instead of actually deriving some off-peak energy supply from the "net" which often includes cheaper electrical power generated by nuclear plants, the proposed activity would account for 3 percent of the ground level pollutant concentrations contributed by the Manatee Station operating at maximum capacity.

An impact assessment of the Manatee Power Plant was prepared for Florida Power and Light Company (ESE, 1976)* for a condition of 2.5 percent sulfur fuel. Modeling results (uncalibrated) of the maximum sulfur dioxide concentrations corrected to maximum (100 percent) capacity of 21 micrograms per cubic meter, annual

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* ESE, 1976 - A Sulfur Dioxide Impact Assessment of the Manatee Power Plant for Florida Power and Light Corporation, April, 1976.

average, 105 micrograms per cubic meter, 3-hour average were determined from this study. The short-term maximum effects would occur at an approximate 24 kilometer distance from the proposed activity, a distance where short-term contributions from the proposed activity would be negligible. The long-term maximum effect occurs approximately 5 kilometers east of the power station (or 14 kilometers west of the proposed activity). For practical purposes annual sulfur dioxide concentrations effects of the proposed facility are nearly negligible beyond 1 - 2 kilometers of the source and are certainly negligible at the point of interaction between the two sources. The induced or secondary sulfur dioxide impacts produced by the FP&L Manatee Power Station (maximum concentration locations) for 2.5 percent sulfur fuel would be 0.6 micrograms per cubic meter, annual average, 3 micrograms per cubic meter, 24-hour average, and 14 micrograms per cubic meter, 3-hour average. (For reference, allowable PSD increments are 20 micrograms per cubic meter, annual average, 91 micrograms per cubic meter, 24-hour average and 512 micrograms per cubic meter, 3-hour average.) Since construction of the proposed activity has not yet been undertaken and the estimated construction schedule for the proposed activity is of approximately 2 years duration, restoration of the Florida Implementation Plan requirement for use of low sulfur fuel at the Power Station would reduce the above projected impacts by a factor of 2.5, or to maximum values of 0.3, 1 and 5 micrograms per cubic meter, respectively. The corresponding PSD Levels of Significance are 1, 5 and 25 micrograms per cubic meter. Therefore, the induced effects would be well below sulfur dioxide significance levels for either 1.0 or 2.5 percent sulfur fuel oil.

RESPONSE W-56

The intermediate term impact of a hypothetical embankment failure on the ability of the Manatee County Water Plant to treat and dispose of the increased suspended solids load was re-evaluated based on a more accurate estimate of the suspended solids

concentration at the plant intake and the results of recent jar tests conducted by the Manatee County Utilities Department. The percent removed of the estimated 730 milligrams/liter (mg/l) of total suspended solids (TSS) entering the reservoir following a hypothetical accident was recomputed using the average particle size distribution and specific gravity of waste clays from Florida phosphate mines*. Revised computations indicated that all particles greater than 2.2 micron size would settle to the bottom of the reservoir prior to reaching the water plant intake structure. From the particle size distribution curve, it was estimated that 42 percent of the suspended matter would be removed. Hence, the remaining 58 percent or a maximum of 425 mg/l could be expected to enter the lowermost intake structure at 15.25 feet (Mean Sea Level) elevation.

Results of jar tests conducted by the Manatee County Utilities Department (Conservation Consultants, Inc., 1980) indicated that approximately a 61% increase in the normal alum dosage would be necessary to effectively remove 425 mg/l of suspended solids. The expansion of the treatment plant from 30 to 50 million gallons per day scheduled for completion in May 1981 will mitigate the impact of a sudden increase in TSS loading. Nevertheless, the sludge handling system of the facility would be potentially stressed by the increased mass of solids. To protect the sedimentation basin scraper assembly from possible damage, some increase in the frequency of basin blowdown would probably be necessary. The resulting increase in the volume of sludge would likely exceed the planned capacity of the drying bed and lagooning system. Proper disposal of the excess sludge would require either modifications to the existing facility or transportation of the wet sludge to another disposal site. If a satisfactory method for disposing of excess sludge were developed, no reduction in the water production capacity of the plant would be necessary.

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* Lamont, W. E., J. T. McLendon, L. W. Clements, Jr., and I. L. Feld (1975), "Characterization Studies of Florida Phosphate Slimes," U.S. Department of Interior, Bureau of Mines Report of Investigations, RI 8089.

Shutdown of the treatment plant or reduction in operating capacity would probably be necessary for a short period following a hypothetical embankment failure. If provisions for disposing of the increased sludge volume were made expeditiously, it is possible that the plant could continue operating without a significant reduction in capacity.

Comprehensive analysis of the several effects of a hypothetical embankment failure on the water plant made by engineers thoroughly acquainted with the design and operation of the plant would be necessary to accurately determine the cost to return the plant to operating condition and the increased cost of operation. Among the factors contributing the total cost would be duration of shutdown period, availability and cost of treated water from other systems, amounts of additional chemicals (coagulants/flocculants) required, percent moisture and volume of excess sludge and cost of alternative disposal methods.

RESPONSE W-57

The prediction of mixed concentrations of various constituents in Lake Manatee following the hypothetical release of the entire 1,000 acre feet of clear water from the proposed clay settling area was made to provide a conservative estimate of resultant concentrations at the reservoir dam - the location of the intake structure to the Manatee County Water Plant. It is not unrealistic to approximate the maximum concentration of a given soluble constituent at the dam by assuming that water, hypothetically released from the clay settling area, mixed completely with the water inventory of the reservoir. Water entering the head of the reservoir must travel a distance of over 5 miles to the dam thereby providing the opportunity for thorough mixing. Additional time for dispersion of dissolved constituents would be provided during the minimum one-week plant shutdown which would follow an accidental embankment failure. (See Response W-56.)

The assumption that mixing would be instantaneous is not realistic nor is it necessary to support the above prediction. The estimates were conservative in that the dilution of water released from the settling area by the inventory in the ten-mile stretch of river between the point of embankment failure and the reservoir was neglected in the computation.

RESPONSE W-58

Results of a re-evaluation of the impact of a hypothetical clay settling area embankment failure on the ability of the Manatee County Water Plant to treat and dispose of the additional suspended solids load were discussed in detail in Response W-56. To summarize this response, recent tests conducted by Manatee County Utilities Department indicated that raw water with suspended solids concentration at the level expected in the event of a clay settling area dam failure was treatable by the present facility. The primary operational problem during a period of elevated TSS loading would be accomodating the greater than normal rate of sludge production. If sludge disposal were limited to available (and planned) on-site facilities, some reduction in plant capacity would be necessary, but the reservoir could remain operational. If a satisfactory method for disposing of excess sludge were developed, no reduction in capacity would necessarily be required.

Available evidence does not indicate that the reservoir would be rendered inoperative in the long term or that the intermediate term expense of additional treatment would be prohibitive. Comprehensive analysis of the several effects of a hypothetical spill on plant operations made by engineers thoroughly acquainted with the design and operating features of the plant would be necessary to accurately determine the impact on operating cost.

RESPONSE W-59

The projected concentration of suspended solids at the intake to the Manatee County Water Plant following a hypothetical clay settling area embankment failure was re-evaluated based on a

waste clay particle size distribution more representative of the clays expected from the proposed Duette Mine. (See Response W-56.) A maximum suspended solids concentration was predicted in the event of an embankment failure. The basis for the projection is described in errata to Appendix F of the Surface Water Quality Resource Document.

Since radium-226 is predominantly associated with suspended solids, the projected radium-226 level at the intake structure was similarly revised to 4.2 picocuries/liter (pCi/l). This satisfies the State standard of 5.0 pCi/l for Class I-A waters. The basis for computation of the radium-226 level is given on page 119 of the Surface Water Quality Resource Document and in errata thereto.

RESPONSE W-60

The Consumptive Use Permit (SWFWMD, 1978) requires the recharge of approximately three million gallons of water per day to the Floridan Aquifer through a system of connector wells. At the present time, Estech, through its consulting hydrologists, is conducting intensive recharge investigations on the project site aimed at providing additional data for further determining both the quantity and quality impacts that will result from the proposed recharge program.

As a condition of the Consumptive Use Permit, all data collected during these investigations, including radiation studies, will be evaluated by the SWFWMD, and the proposed design and location of permanent recharge wells must be approved by the SWFWMD staff in advance of construction permitting. It is believed that the data developed during the recharge investigations when related to the conditions in the Consumptive Use Permit will prevent the degradation of the quality of water in the Florida Aquifer. The "Terms and Conditions" relating directly to the recharge of water to the Florida Aquifer are presented in Items 10.h. through 10.j. of the Consumptive Use Permit as follows:

10. Applicant shall, within the time limits hereinafter set forth, complete the following items, and if applicant fails to complete them by the specified date, then this Permit shall automatically become null and void.

h. Within one (1) year of the data of issuance of this permit, the permittee will begin to construct a system of connector wells for the purpose of recharging 3,024,000 gallons per day (average annual) from the unconfined surficial aquifer and/or secondary artesian aquifer to the Florida Aquifer. Construction of this system of connector wells will be completed prior to the start of withdrawals as permitted herewith and shall be operated in such a manner as to maximize the amount of recharge. The design(s) and locations of these wells must be proposed in writing to the District Staff within 8 months of the date of issuance of this permit and must be approved in writing by the District Staff in advance of construction permitting.

i. Flow measurements must be performed on each of the connector wells immediately upon completion of construction and then once a month thereafter unless otherwise approved in writing by the District Staff. Flow measurements are to be submitted in writing to the District on April 15, July 15, October 15 and January 15, for each preceding calendar quarter.

j. Water quality analysis will be performed on the water moving in the Florida Aquifer through the system of connector wells. All wells will be sampled immediately following completion of construction and each month thereafter. The water quality analysis will include, but need not be limited to the following constituents.

(a) Total coliform count
(b) Fecal coliform count
(c) Gross alpha radiation (if greater than 15 pCi/liter analyze for radium 226, total radium)
(d) Iron
(e) Fluoride
(f) Phosphorus
(g) Sulfate
(h) Pesticides
(i) Organic Carbon
(j) Specific Conductance
(k) Nitrate
(l) Phosphates (ortho, total)
(m) Total dissolved solids
(n) Total suspended solids
(o) Turbidity

The sampling procedure and list of constituents may be modified by District Staff when deemed necessary to monitor the conditions of the water resources of the area. The analysis shall be performed by standard method procedures. At least quarterly, the analysis shall be performed by an independent testing laboratory. A written report of the analytical results must be forwarded monthly to the District.

Should the water quality analyses lead the District Staff to conclude that the connector well system is degrading the quality of the receiving waters so as to be significantly harmful to the water resources of the area, it may, following written notice to Permittee, take the matter to the Board, who, after a public hearing thereon, may take appropriate action to protect the resource, including modification of the terms and conditions of this Permit.

RESPONSE W-61

The flow direction and flow rate of water in the artesian groundwater system is governed by a series of well-known and experimentally-proven principles and equations. Chief among them is Darcy's Law (Darcy, 1856). Numerous other formulae have been developed but all comply with Darcy's Law. Simply stated, this law requires that water move from a point of higher potential to one of lower potential at a rate depending on the difference in the two potentials and the hydraulic character of the medium within which it flows.

The present regional flow-rate within the artesian system in the area of the proposed Estech mine is about 60 feet per year. By withdrawing water from the artesian system, groundwater gradients within the local area are changed, thereby effectively capturing about 67% of the artificially-recharged water from the duration of withdrawals. When withdrawals cease, all of the artificially-recharged water not physically removed from the aquifer by the wells will begin following the regional-flow direction. At a flow rate of 60 feet per year it would take about 90 years to travel 1 mile. During that 90 years an estimated 66,000,000,000 gallons of water will be recharged naturally on the area underlain by artificially-recharged water. The total quantity of artificially-recharged water during the life of the mine will be about 22,000,000,000 gallons - a dillution of 3 to 1. These estimates are based on no dispersion or mixing taking place with the estimated 900,000,000,000 gallons of water stored in the potable zones of the aquifer directly underlying the mine site.

The permit acquired by Estech (SWFWMD, 1978) is designed to preclude the artificial recharge of water which does not meet strict water quality standards. It is believed that these standards are sufficient to protect the artesian groundwater system from degradation.

RESPONSE W-62

The method by which sand and clays are mixed has not been determined and continues to be a subject of research and investigation. The use of flocculants in the sand-clay disposal system is just one of several methodologies under consideration.

Should flocculation be employed in the sand-clay mix technique, it is not expected to deteriorate the groundwater for the following reasons;

a) Flocculants have been and continue to be deemed safe for use in potable water treatment facilities. The type of flocculants (polyelectrolytes) generally used in industrial and municipal water treatment are similar to those that would be used by Estech, should this method be utilized.

b) Flocculants inherently have a severe affinity to particles and provide an anchoring effect with the available solids. This is evidenced by the fact that 80 to 99% of the flocculant exits with the affected solids and remains attached.

c) Due to the high cost of flocculants and their effectiveness, concentrations are typically kept around two parts per million.

Contaminants which enter the recirculation water system from the ore beneficiation process will rapidly bind to suspended clay particles and may ultimately be deposited in the clay settling area. The minimal seepage which is expected to occur from the clay settling area and various circuits in the recirculation system will have essentially the same quality as the treated effluent discharged from the clay settling area. The quality of the discharged water is discussed in the DEIS and in greater detail in the Water Quality Resource Document.

Loss of the recycled water will generally be confined to the surficial aquifer in the immediate area of the seepage.

As stated in the Water Quality Resource Document, the flotation reagents have preferential affinities for clay wastes and exit the water circulation route adhered to these solids. Reagent use is strictly limited to levels not appreciably exceeding the quantities that adhere to the material leaving the flotation circuit. Any residual reagent is afforded further opportunity for attachment by additional contact with waters containing clay from other plant operations.

The movement of water within the surficial aquifer has been determined to be very limited due to the permeability of the wastes in the clay storage areas (Bromwell, 1976). This fact, coupled with the sealing of the storage areas which typically accompanies clay disposal, will confine the water quality effects to the vicinity of the waste clay storage facility.

RESPONSE W-63

Thousands of acres of native vegetation have been stripped in central Florida for phosphate mining, agriculture and other purposes without documented effect on local climates. There is nothing in the proposed actions to suggest that such effects will now be exhibited. Mining will take place, parcel by parcel, over a period of 30 years. As a result, no large blocks of land will be stripped of vegetation at any given time. The larger drainages will be preserved. Small drainageways feeding these larger ones will be created in the reclaimed land. These drainages will be designed and vegetated in a way so as to maximize water quality benefits and flood control, as was discussed in the Draft Environmental Impact Statement.

RESPONSE W-64

The entire Duette Mine site is subject to permitting at numerous regulatory levels. In addition to the environmental considerations tions considered during the NPDES/EIS process, runoff is specifically

addressed and regulated through State of Florida Dredge and Fill permitting procedures and stormwater control review. As discussed in the DEIS, runoff from active mining and reclamation areas, roadways and beneficiation plant area will be collected in drainage ditches and routed to the recirculation system for treatment, thereby reducing the potential for non-point source pollution.

RESPONSE W-65

Mining of minor tributary streams and bayheads adjacent to major streams will unavoidably contribute to water quality degradation. This was one purpose for preserving 25% of Category 2 tributary and headwater wetlands. Also, safeguards have been built into the mining plan so as to prevent water quality parameters from dropping below the minimum threshhold values specified by pertinent regulatory agencies. (See Response W-21.)

RESPONSE W-66

The average rate of discharge to the North Fork of the Manatee River during times of discharge will be 1,231 gallons/minute and not the 35,700 gallons/minute incorrectly specified in Comment W-66.

No ambient water quality standards applicable to the receiving waters are expected to be exceeded under any of the examined conditions of stream and effluent discharge rates. Under conditions of average minimum stream flow and maximum effluent fluoride loading, the fluoride concentration in the North Fork may be expected to increase to 5.7 mg/l at the point of mixing. This projected fluoride concentration is less than 60 percent of the state fluoride standard of 10 mg/l applicable to Class III fresh waters.

As pointed out in Section 4.3 of the Surface Water Quality Resource Document, under the extremely infrequent condition of minimum stream flow coincident with maximum allowable effluent fluoride discharges from P.O.D. 002 and 003, the resultant

fluoride concentration at the head of Lake Manatee (Station 10) would be approximately 1.7 mg/l. This level of dilution (from 10 mg/l to 1.7 mg/l) would be accomplished with runoff from approximately 80 square miles or 65 percent of the entire Lake Manatee watershed, i.e., all of the watershed upstream of Station 10 (U.S.G.S. Gauging Station No. 23000). Taking into account runoff from the remaining 43 square miles of the watershed between Gauging Station 23000 and the Lake Manatee dam, fluoride concentrations at the Manatee County Water Plant intake would be further diluted to a level well below the state fluoride standard of 1.56 mg/l for Class I-A waters.

RESPONSE W-67

The hydrogeologic system which exists in this area of the state is basically a two-layer leaky-artesian/water-table system. This means that water from the water table leaks downward into the artesian system. When withdrawal from the artesian system commences, a cone of depression is formed which grows until sufficient water is captured within the flow network it forms to satisfy the withdrawal rate. In a leaky-artesian system, cessation in growth of the cone (steady-state condition) is a result of the capture of additional recharge. Thus, of the 10 mgd withdrawn, only about 6 mgd will be supplied by recharge within the flow net of the withdrawals; the remaining 4 mgd will be captured from the regional flow system. At a distance of about 5 to 6 miles down-gradient of the mine, the potentiometric contours are unaffected by the Estech withdrawals, indicating that the regional flow pattern has been reestablished and that losses resulting from of the withdrawal are negligible. The 4 mgd of regional flow captured by the withdrawal have been replaced by additional recharge <u>not</u> captured in the flow net.

The DEIS (p. 78) described a "worst case" approach to evaluating the impact on the freshwater/saltwater interface. This volumetric approach assumes no recharge of any amount nor the capture of regional flow. Even with these severe constraints,

the movement of the interface is estimated to be only 102 feet/year (1 mile in 52 years).

The USGS (1979) indicates that rural groundwater use in Manatee and Sarasota Counties in 1977 was (6.48 + 6.987) 13.46 mgd. The self-supplied industrial withdrawal was (3.35 + 2.92) 6.27 mgd for citrus and food processing. Irrigation withdrawal was (40.98 + 22.73) 63.35 mgd, primarily for truck farming, citrus and pasture. The 1977 reported withdrawal by Sarasota County was 9.5 mgd, primarily for the City of Sarasota from the Verna Well Field. The pumpage of these existing uses, the vast majority of which lie coastward of the Estech property, would undoubtedly have more impact than the proposed project on the movement of the interface

RESPONSE W-68

It is generally assumed that vegetation is controlled to a large extent by soil parameters and that any given vegetation type is restricted to a given soil type or several related soil types. Agricultural crops (or at least yields) definitely show such relationships. Serpentine soils are often cited for their remarkably distinct indigenous floras, as compared to those floras of adjacent, non-serpentine soils.

In Florida, the often close relationship between soil type and vegetation is not seen, or where it is observed, notable exceptions are common. For example, see the article by C. L. Coultas, A. F. Clewell, and E. M. Taylor, Jr., "An Aberrant Toposequence of Soils Through a Titi Swamp", published in the Journal of the Soil Science Society of America, Volume 43, pages 337-383, 1979. The two major reasons for the lack of a clear relationship between soils and vegetation in Florida are as follows. First, the parent material is not diverse and usually consists of rather fine, sterile sands. One might argue that peaty soils of marshes and bogs are distinct in composition and contain a distinctive vegetation. On the other hand, the peats are the products of plant decomposition and were formed under

the influence of the vegetation and not vice versa. Also one might argue that near-surficial limestone or argillic horizons change the character of the soil. Such soils are often more fertile and support a greater species composition, but the basic communities are generally the same as in similar habitats containing deeper sterile sands.

Second, the absence of significant topographic relief and the rather uniform warm wet climate contribute to uniform development of soils in Florida.

Two major environmental factors control the vegetation in virtually all habitats in Florida: the soil moisture regime and the frequency and intensity of fire. Soil parameters, other than soil moisture, collectively constitute a distant third set of factors influencing the vegetation. Some vegetation types correlate well with certain soil types in Florida and can be mapped within the same mapping unit. Such correlations, though, do not necessarily infer a direct influence of soil over the vegetation. Usually the soil and the vegetation have developed independently in response to a particular surface hydrology. In addition, there is usually at least some interaction between soils and vegetation, each influencing the development of the other.

In phosphate strip mine reclamation, the soil type is not nearly as important to know as the soil moisture regime and the texture of the surficial horizon. Plant response can be predicted adequately from this information, even if it is rather general. If the standard terminology for soil nomenclature were applied to the reclaimed sites, only the more generalized, higher categories in the current system of soil taxonomy could be used. More specific soils series are not applicable because they pertain only to soils with well developed profiles. The soils of recently reclaimed sites consist merely of parent materials which will take decades of development before the characteristic soil horizons of recognized soils series become evident.

RESPONSE W-69

Native soils are relatively sterile sands. Reclaimed lands that contain a higher proportion of clay potentially will be more fertile and will have better moisture retention than native soils. Within a few years after mining, the reclaimed areas should be at least as heavily vegetated as they were before mining.

RESPONSE W-70

The Florida Administrative Code requires that reclaimed phosphate mines be revegetated immediately. This practice minimizes the possibility of sheet erosion and thereby protects receiving water bodies from turbidity, siltation and possibly undesirably high levels of available nutrients. Wind erosion is also reduced, thereby minimizing fugitive dust. Planting any cover crop requires an energy output. Bahia grass is commonly used as a cover crop because of its availability, low cost, low maintenance (and thus low energy requirement), and rapid and effective ability to form a dense sod. The ability of turf grasses such as bahia to form a topsoil is well known. In the absence of any particular land use for a given parcel of reclaimed land, the establishment of bahia grass is desirable from the standpoint of topsoil development.

The applicant's proposal to initially reclaim for pasture grass is assumably largely in response to minimum requirements of state and local land reclamation requirements. Planting a cover crop of pasture grass provides compliance with state law requiring establishment of ground cover after reclamation for erosion control. The local (Manatee County) mining ordinance further requires that the rural areas where mining occurs be returned to agricultural uses upon completion of mining activities. Pasture also meets this requirement. It should be noted that the mining operation is viewed to be a temporary land use with the ultimate, long-term land uses actually dependent upon subsequent land owners. It cannot be determined at this time if the applicant's proposal to largely reclaim lands to pasture

grasses is a long-term commitment to an engery-intensive agricultural practice.

RESPONSE W-71

The comment is correct in so far as the soil microbiota has not been subject to study on mined lands in Florida. The comment also extends to virtually all soils of natural plant communities in Florida. Microrhizal fungi are prominent in most natural communities and are known to improve the colonization of plants on reclaimed strip mines elsewhere in the United States.

The chief explanation for the negligible recolonization of indigenous upland vegetation (i.e., of flatwoods, scrub, palmetto prairie) is not necessarily the absence of particular soil microflora. It is more likely the unavailability of seeds and other propagules. An examination of previously mined lands which have been allowed to revegetate without interference from man shows that a particular assemblage of species typically becomes established and persists indefinitely. Normal plant succession, as it is usually described in ecology tests, is arrested by these persistent plants which are sufficiently competitive to exclude the invasion of dominant species that occupied these lands before mining. The persistent species tend to be weedy or brushy, many of them having been introduced from the tropics and naturalized. A more desirable mixture of native forest species develops typically only adjacent to undisturbed stream-side forests which serve as a seed source. This was the rationale for preserving some Category 2 Tributary and Headwater wetlands.

RESPONSE W-72

You are correct in pointing out that soil biology has been generally neglected in the Estech and other EIS's. However, it is hoped that reclamation can proceed and be successful without a detailed knowledge of soil biota. Experience has shown that self-maintaining vegetational recolonization is generally unavoidable following land disturbance and soil redistribution. However, the quality of the self-maintaining, living communities

is what an acceptable reclamation plan must address. Species diversity and indigenousness have been considered in the Estech reclamation, and large scale efforts are an integral part of the methodologies. (See Reclamation Methodology Resource Document.) These efforts must prove successful as required by State and Local reclamation plan approvals.

RESPONSE W-73

A withdrawal schedule of 13 mgd for the first three years - decreasing thereafter to 10 mgd for the rest of the life of the mine - is mandated by the Consumptive Use Permit (SWFWMD, 1978). The permit expires on September 5, 1984, and will be evaluated for renewal at that time.

The permitting process requires the applicant to demonstrate that the withdrawal be reasonable, beneficial and in the public interest and not constitute a detriment to existing uses or to the water resources. In evaluating an application to determine the compliance with numerous rules delineating acceptable limits, the District includes the "5-foot" rule requiring the withdrawals to be such that the effect of the requested withdrawals do not cause a water-level drawdown of more than 5 feet outside the applicant's property. A 5-foot drawdown is about one-sixth (1/6) of the fluctuation currently observed at the proposed mine site. The water-use permitting in Florida does not discriminate among proposed uses so long as that use is in the public interest and is reasonable and beneficial.

RESPONSE W-74

Estech's proposed operation comes under the rules of the Mine Safety and Health Administration and must comply with all rules and guidelines published by the Administration or any other Federal or state agency responsible for promulgation of rules for the protection of employees. No worker protection measures specifically aimed at preventing radiation exposure have been planned by Estech for implementation at the proposed Duette Mine. As the writer pointed out, epidemiological studies are

presently underway investigating a possible association between lung cancer and working in the phosphate industry. Estech is participating in one such study which is being conducted industry-wide by the University of North Carolina at Chapel Hill. If the results of these studies indicate that protective measures are needed for employees, it is expected that they will be made mandatory by state and Federal regulations. Estech will be required at that time to implement the applicable protective measures. In the meantime, certain aspects of the working conditions associated with any particular job at the mine or beneficiation plant may provide de facto protection from radiation exposure. For example:

1) The dragline crew is protected by the fact that they work on a machine which is totally enclosed. The operator's cab is air-conditioned, and the machinery decks are highly ventilated with filtered air in order to cool the electric motors. In addition, the crew is located some 50-250 feet from the mine pit.

2) The crews responsible for the slurrying of the matrix for transport to the washer also work inside air-conditioned hydraulic gun sleds. It is not necessary for them to be in continuous contact with any material.

3) The washer, feed preparation and sizing sections are all open-air structures, the operators again do not handle material for any great length of time, and no dust evolves due to the fact the material is separated by washing with water.

4) The flotation plant is enclosed because of the type of equipment used. However, the crew room is air-conditioned. The crew does not inhale dust, because the material is still being processed wet. The Flotation Building is adequately ventilated, because the first floor is some 10 feet above grade and the floor is grated. The building is only enclosed from the top and sides. Adequate air circulation is maintained to prevent any build-up of harmful gasses or fumes.

5) The personnel who work in the dry rock area are protected from exposure by proper ventilation, pollution control equipment and masks while working near dry rock loading stations and silos, and by the fact there is only limited contact with the material.

RESPONSE W-75

Because what constitutes either a safe working level or excessive occupational exposure for tunnel workers has not yet been established, Estech has not planned monitoring of the tunnels. Depending on the outcome of the ongoing studies mentioned in the preceding response, it is expected that a safe working level will be established and Federal and state regulations will require it be maintained and monitored. At that time, the precise type of monitoring equipment required and an appropriate monitoring program can be determined. In addition, Estech has advised EPA that it will install an appropriate monitor for radon gas unless the study results prove it unnecessary.

RESPONSE W-76

Consultation with the Department of the Interior was officially initiated by EPA on February 14, 1980. The recommendations presented in the Department's Biological Opinion will be imposed as conditions of the proposed NPDES permit. Copies of all official corresondence documenting the consultation process are presented herein. Also presented are letters indicating Estech's initial steps to comply with the Department's recommendations.

RESPONSE W-77

Several points in combination address the concern expressed for the Myakka River Basin. First, it should be emphasized that, as the writer was aware, the proposed mine is not in the Myakka River Basin and would have no direct or secondary effects on that basin. Secondly, the DEIS is clearly and deliberately a "site specific" EIS and accordingly has limited application to any other site. The Estech DEIS was the first site specific EIS to be based upon the information and recommendations developed in the generic EIS - the Central Florida Phosphate Industry Areawide EIS - published by EPA in 1978. The Areawide EIS does recommend certain mining and reclamation practices for all new mines in Central Florida and could certainly be considered precedent setting in a general sense. However, any new source

February 14 1980

REF: 4SA-EIS

Kenneth E. Black
Regional Director
U. S. Fish and Wildlife Service
Region IV
Richard B. Russell Federal Building
75 Spring Street S. W.
Atlanta Georgia 30303

Dear Mr. Black:

The Estech General Chemical Corporation (formerly Swift) proposes to develop a new phosphate mine in Manatee County Florida. The mining operation would require a new source NPDES permit and is therefore subject to the requirements of NEPA. The DEIS for the Estech proposal was published in October of 1979 A copy was provided to U.S.F.W.S. for comment in accordance with the Fish and Wildlife Coordination Act however this Agency has not previously initiated consultation procedures pursuant to Section 7 of the Endangered Species Act. Please consider this letter a formal request from EPA for consultation in accordance with the provisions of the Act.

A list of threatened and endangered species that may be found in the project area has previously been requested and received by the consultant preparing the EIS on behalf of EPA. We would appreciate confirmation of the accuracy of that information as contained in the DEIS. Further Section 7 (c) of the Endangered Species Act provides that the required biological assessment may be undertaken as part of a Federal agency's compliance with NEPA, as would be the case with the Estech EIS. Therefore please advise us as to the adequacy of the biological assessment contained in the DEIS and Biology and Ecology Resource Document. Lastly if the assessment is adequate then we require a letter stating the Service's biological opinion pertaining to the action proposed in the DEIS.

To expedite matters, I am sending the Estech DEIS and the Biology and Ecology Resource Document directly to Mr. David Peterson in the U.S.F.W.S. office in Jacksonville, Florida. In future handling of the Central Florida phosphate EIS's we will begin coordination with Mr. Peterson during the scoping process so that consultation procedures if necessary can be initiated at a much earlier time.

Sincerely,

A. Jean Tolman

cc: David Peterson
JTolman/ar/2-14-80

United States Department of the Interior
FISH AND WILDLIFE SERVICE
75 SPRING STREET, S.W.
ATLANTA, GEORGIA 30303

MAR 27 1980

Ms. A. Jean Tolman
Environmental Protection Agency
345 Courtland Street
Atlanta, Georgia 30308

Dear Ms. Tolman:

We have received your February 14 letter regarding consultation on a permit for a phosphate mine in Manatee County, Florida. In future correspondence, please refer to our log number on this project, 4-1-80-A-152.

Our Jacksonville Area Office has the draft impact statement and the Ecology Resource Document under review, and will soon determine if the information is adequate to prepare a biological opinion, and if the species list is accurate. If the list and information are satisfactory, a Biological Opinion will be issued. Should more information be required, we will contact you soon.

We concur with your determination to begin project coordination with the Area Office. In our effort to reduce paperwork and save time, we are now asking federal agencies to request the list of species directly from the Area Office, rather than from the Regional Office.

Thank you for your interest and support of the endangered species program.

Sincerely yours,

Acting Deputy Regional Director

United States Department of the Interior
FISH AND WILDLIFE SERVICE
75 SPRING STREET, S.W.
ATLANTA, GEORGIA 30303

Ms. A. Jean Tolman
Environmental Protection Agency
345 Courtland Street
Atlanta, Georgia 30308

Dear Ms. Tolman:

This presents the U. S. Fish and Wildlife Service's Biological Opinion regarding Estech General Chemical Corporation's proposed development of a new phosphate mine in Manatee County, Florida (Log No. 4-1-80-A-152) and its potential impact on threatened and endangered species. We concur with the list of species that was presented in the Draft Environmental Impact Statement (DEIS). They were bald eagle, red-cockaded woodpecker, American alligator, Eastern indigo snake, and Florida panther. We have determined that the bald eagle, Florida panther, and red-cockaded woodpecker will not be affected by this project. The two threatened species that were identified as being adversely impacted by the mining operation were the American alligator and Eastern indigo snake. Consultation was initiated on February 14, 1980. The phosphate mine and beneficiation facility will be located in northeastern Manatee County. The proposed complex encompasses 10,394 acres of which approximately 6,600 acres are suitable for mining.

As indicated in the DEIS, the alligator "will decline somewhat during the mining operation but will increase above present levels with the addition of 384 acres of lakes and a 15 percent increase in other wetlands when reclamation is completed. The Eastern indigo snake will decline in numbers with the destruction of swamps during the mining operation, but should recoup their former numbers after reclamation is completed." Insofar as the indigo snake is concerned, this is partially true. However, the upland habitat which is also utilized by this species, will be altered with resultant loss of some animals during the mining operation.

The DEIS indicated that, with the exception of a 100-acre area, all land disturbed by the operation will be restructured and/or backfilled with waste material, and revegetated either by natural succession or by artificial planting. It appears that the reclamation effort for the lakes and wetlands will be appropriate for the alligator.

Therefore, after reviewing the information provided in the DEIS, it is our opinion that the above action is not likely to jeopardize the continued existence of the American alligator or Eastern indigo snake and will only temporarily modify habitat essential for their continued existence in that specific area. An administrative record of this consultation is on file in our Jacksonville Area Office.

Due to the possibility that Eastern indigo snakes will be destroyed during the mining operation, we strongly recommend that Estech Chemical contract with a qualified individual, holding a permit, to recover indigo snakes from the work area for relocation. For further information regarding qualified individuals and possible relocation sites, please contact Mr. Don A. Wood, Endangered Species Coordinator, Florida Game and Fresh Water Fish Commission, 620 South Meridian Street, Tallahassee, Florida 32301.

It may also be beneficial for individuals who will work in the field to view a slide program describing the Eastern indigo snake and comparing it to other species of snakes that may be encountered in the mining area. This may result in a number of Eastern indigo snakes being saved from destruction.

After reviewing the available information on this project, it appears that cumulative effects do not apply in this instance. However, if modifications are made in the project or if additional information becomes available regarding threatened and endangered species and potential impacts, then consultation should be reinitiated. This Biological Opinion is intended to assist the Environmental Protection Agency in meeting its responsibility under Section 7 of the Endangered Species Act, as amended.

Sincerely yours,

Richard J. Huber

Regional Director

Estech General Chemicals Corporation

May 13, 1980

Mr. Don A. Wood
Endangered Species Coordinator
Florida Game & Fresh Water Fish Commission
620 South Meridian Street
Tallahassee, Florida 32301

Dear Mr. Wood:

The U. S. Fish and Wildlife Service has issued a "no jeopardy" Biological Opinion regarding the proposed Estech Duette Mine. Due to the possibility that Eastern Indigo Snakes will be destroyed during the mining operation, it was recommended that Estech contact a qualified individual who would be able to recover the Indigo Snakes for relocation. I was advised to write you and ask for names of such qualified individuals and any relocation sites that might be available.

I must tell you that our actual mining operation is still 3 - 4 years away. Therefore, there is no great emergency to proceed with this item. My only reason for writing at this time is to get something in the file as to names and addresses and possible location sites.

I look forward to hearing from you.

Very truly yours,

ESTECH GENERAL CHEMICALS
CORPORATION

Joseph E. Davis
Manager of Projects

JED/nal
Enc.

cc: Ms. A. Jean Tolman
w/o Attachment

First Commercial Bank Bldg., 410 Cortez Rd. W., Bradenton, Florida 33507

FLORIDA GAME AND FRESH WATER FISH COMMISSION

CECIL C BAILEY
Chairman, Jacksonville

THOMAS L. HIRES SR
Vice Chairman, Tampa

DONALD G RHODES D D S
West Eau Gallie

R BERNARD PARRISH JR
Tallahassee

C TOM RAINEY D V M
Miami

ROBERT M BRANTLY, Executive Director
H E WALLACE, Assistant Executive Director

FARRIS BRYANT BUILDING
620 South Meridian Street
Tallahassee, Florida 32301

May 22, 1980

Mr. Joseph E. Davis
Manager of Projects
Estech General Chemicals Corporation
First Commercial Bank Building
410 Cortez Road, West
Bradenton, Florida 33507

Mr. Davis:

Thank you for your May 13 letter regarding relocating indigo snakes. Upon any and all encounters with indigos during your mining operations, you should contact Mr. Paul E. Moler, Florida Game and Fresh Water Fish Commission, 4005 South Main Street, Gainesville, Florida 32601, 904/376-6481. You may contact me (904/488-3831) should Mr. Moler be unavailable. By copy of this letter I am asking Mr. Moler to contact you and provide guidance as to how any encountered indigos should be handled and stored until one of us can retrieve them.

Cordially,

Don A. Wood

Don A. Wood
Endangered Species Coordinator

7766/mms4/33
cc: Paul Moler

mine proposed for the Myakka Basin would also require a site specific EIS, and full consideration would be given at that time to any river designated, or being considered for designation, as a Wild and Scenic River. Furthermore, EPA's obligation to coordinate with the Department of the Interior is clearly established by law, under the Wild and Scenic River Act, and by EPA's own implementing procedures on NEPA (40CFR Part 6).

RESPONSE W-78

EPA has complied fully with 36 CFR Part 800 and 36 CFR Part 63; documentation of this compliance is presented on the following pages. The Parrish Mounds are not on the subject property and will not be affected by the proposed project. Although the Keeper of the National Register has not yet made a determination of eligibility for the Carruthers Mound, EPA has, in accordance with Section 63.2 of 36 CFR, proceeded on the assumption of its eligibility in order to obtain comments from the Advisory Council of Historic Preservation. In brief, the Carruthers Mound will be preserved from mining and any associated disturbances, and both the Advisory Council and the State Historic Preservation Officer are satisfied with the steps being taken to assure preservation.

Lastely, as stated in this agency's July 10, 1980 letter to the Advisory Council, EPA is in the process of securing the additional information needed by the Keeper of the Register to make the eligibility determination. Additional archaeological field work also performed during July 19-25, 1980 and a report of that investigation will shortly be submitted to the Keeper of the National Register.

RESPONSE W-79

The proposed clay settling area embankments will be designed and constructed of earthen materials in accordance with the stringent safety standards required by Chapter 17-9 of the Rules of the Department of Environmental Regulation. Similarly

April 29, 1980

REF: 4SA-EIS

Mr. L. Ross Morrell, Director
Division of Archives, History and Records Management
and State Historic Preservation Officer
Florida Department of State
401 East Gaines Street
Tallahassee, Florida 32304

Dear Mr. Morrell:

In October of 1979, this agency published a Draft Environmental Impact Statement for the Estech Chemicals Corporation Duette (Phosphate) Mine in Manatee County, Florida. A copy of the pertinent sections of the Summary Document and a copy of the Archeological and Historical Properties Resource Document are provided for your review.

The Department of the Interior submitted the attached letter in response to the DEIS. Your attention is directed to the first paragraph on the second page. The referenced evaluations of archeological and historical resources were performed for EPA by the EIS third party consultant. The purpose of this letter is to carry out consultation with the State Historic Preservation Officer in accordance with 36 CFR Section 800.4, including the identification of resources, determination of eligibility for inclusion in the National Register and determination of effect. All three processes were performed independently by EPA in preparing the DEIS; however, consultation with the State Historic Preservation Officer was inadvertently omitted.

Briefly, as the enclosed materials indicate, the National Register was consulted to identify any properties in the proposed project area included in the National Register; none were identified. Secondly, all properties possessing historical, architectural, archeological, or cultural value located within the proposed project area were subjected to the National Register Criteria set forth in Section 800.10. The DEIS identified a site, the Carruthers Mound, which appears to meet the significance criteria on the ground that it may contain data of regional archeological importance; the basis for this preliminary determination is detailed in the enclosed Archeological Resource Document. (The Parrish Mounds, also mentioned in the DOI letter, are not on the subject property and are not affected by the proposed project.)

Section 800.4(a) (2) requires that if an Agency Official determines that a property appears to meet the Criteria, he shall request, in writing, an opinion from the Secretary of the Interior respecting the property's eligibility for inclusion in the National Register. The attached forms have been filled out for that purpose. Further, 36 CFR Section 63.3 sets forth procedures to be applied when the Agency and the State Historic Preservation Officer agree a property is eligible. The EPA letter provided with the forms is meant to satisfy the requirement for the statement of agreement described in Section 63.3.

If, in fact, you do agree that the Carruthers Mound is eligible, then please forward the forms and supporting materials to the Keeper of the National Register along with a statement of your opinion.

Thirdly, the Criteria of Effect and Criteria of Adverse Effect, set forth in 36 CFR Sections 800.8 and 800.9, respectively, were applied to determine if the proposed project would have an adverse effect on the Carruthers Mound. We have made a preliminary determination that the site would be adversely affected due to "isolation from or alteration of its surrounding environment." Please advise us as soon as possible if you concur with this determination and with the mitigative measures proposed in the DEIS. Those mitigative measures could form the basis for a Memorandum of Understanding between this agency, the State Historic Preservation Officer, and the Advisory Council on Historic Preservation.

If I read Section 800.4 correctly, it is my responsibility to request comments from the Advisory Council after the determination of adverse effect has been made. I would like to do that as soon as possible to avoid causing a costly delay for the applicant. Any help or advice you can offer in this process would be greatly appreciated.

Sincerely,

Original Signed By

A. Jean Tolman
EIS Project Officer

Enclosures

JTolman/ar/4-29-80

Secretary of State
STATE OF FLORIDA
THE CAPITOL
TALLAHASSEE 32304
(904) 488-8472

GEORGE FIRESTONE
SECRETARY OF STATE

May 15, 1980

In reply refer to:

Mr. Louis Tesar
Historic Sites Specialist
(904) 487-2333

Ms. A. Jean Tolman
EIS Project Officer
U.S. Environmental Protection Agency
Region IV
345 Courtland Street
Atlanta, Georgia 30308

Re: April 29, 1980 letter and attachments
Review of Cultural Resource Assessment
Survey Report of Duette Phosphate Mine
and National Register of Historic Places
Inventory -- Nomination Form for
Carruthers Mound (8Ma119),
Manatee County, Florida

Dear Ms. Tolman:

In accordance with the procedures conatined in 36 CFR Part 63 and 36 CFR Part 800, we have reviewed (1) the above referenced project for possible impact to archaeological and historic sites and properties listed, or eligible for listing, in the National Register of Historic Places, and (2) the National Register of Historic Places Inventory - Nomination Form for the Carruthers Mound (8Ma119) in Manatee County, Florida. The authorities for these procedures are the National Historic Preservation Act of 1966 (Public Law 89-665) as amended by P.L. 91-243, P.L. 93-54, P.L. 94-442, and P.L. 94-458, and Presidential Executive Order 11593 ("Protection and Enhancement of the Cultural Environment").

We have reviewed the "Cultural Resources Resource Document Draft Environmental Impact Statement, Swift Agricultural Chemicals Corporation Duette Mine Site, Manatee County, Florida" (1979) by J. Raymond Williams and Roger T. Grange. We have also reviewed the results of the earlier 1974 archaeological and historic survey report on the subject tract by Carl D. McMurray for EcoImpact. On the basis of these two documents, particularly the latter, we concur with the determination that the Carruthers Mound (8Ma119) appears to satisfy the criteria for nomination

to the National Register of Historic Places, and have signed item 12 of the nomination form.

If you have any questions about our comments, plaese do not hesitate to call or write.

On behalf of Secretary of State, George Firestone, I would like to thank you for your interest and cooperation in helping to protect and preserve Florida's historic resources.

Sincerely,

L. Ross Morrell
State Historic Preservation Officer

LRM:Tlt

Enclosure (1)

cc: Carol D. Shull

May 15, 1980

REF: 4SA-EIS

The Keeper of the National Register
National Register of Historic Places
Heritage Conservation and Recreation Service
Department of the Interior
440 G Street, N. W.
Washington, D. C. 20243

Dear Sir:

The Environmental Protection Agency is preparing a Final Impact Statement for the Estech General Chemicals Corporation Duette Phosphate Mine in Manatee County, Florida in consideration of issuing a new source NPDES permit for the mine operation. Accordingly, we are in the process of complying with 36 CFR Part 800 and 36 CFR Part 63, including consultation with the State Historic Preservation Officer for Florida. This agency is in agreement with the State Historic Preservation Officer that the Carruthers Mound, located on the proposed site and described in the attached documents, meets the National Register Criteria set forth in Section 800.10 and is eligible for inclusion in the National Register.

This statement of agreement is intended to meet the requirement of Section 63.3, thus qualifying this agency and the State Historic Preservation Officer to receive your written determination within ten working days of receipt of this letter. Since we will not publish the FEIS until we have fully complied with Parts 63 and 300, your timely response will be greatly appreciated.

Sincerely,

Original Signed By

ar/tol

A. Jean Tolman
EIS Project Officer

Enclosures

JTolman/ar/4-30-80

CONSERVATION CONSULTANTS, INC.

POST OFFICE BOX 35 • PALMETTO, FLORIDA 33561

TELEPHONE 813-722-6668

Consultants in Environmental Biology and Engineering

June 6, 1980

Ms. Jean Tolman
Project Officer, EIS Branch
ENVIRONMENTAL PROTECTION AGENCY
345 Courtland Street, NE
Atlanta, Georgia 30308

Dear Ms. Tolman:

Pursuant to your request and in accordance with the applicable procedures of 36CFR regarding preservation of archaeological and historic sites, Conservation Consultants, Inc. has specifically (±100') located the Carruther's Mound (8-Ma-119) on the attached 1" = 1000' aerial photograph of the Duette Mine site. The mound falls well within an area of the mine site that will not be mined. The limits of mining lies 2,150 feet to the west of the mound, 1,020 feet to the south and 620 feet to the north. To the east and south of the mound lies the north fork of the Manatee River and its floodplain which is to be preserved.

The dragline corridor, pipeline and road right-of-ways occur 620 feet to the northeast of the mound at the closest point. No buildings, roadways, pipelines, excavations or ground disturbance will take place within 400 feet of the mound. Should fencing of the mound be determined to be an appropriate method for preservation of the Carruther's Mound, Estech has agreed (personal communication February 3, 1980) to fence the area in accordance with negotiated specifications.

If you have any questions regarding this matter, please feel free to give me a call.

Sincerely,

H. Clayton Robertson

H. Clayton Robertson
Assistant Project Manager

HCR/lah

Enclosure

cc: J. Davis
R. Rhodes

Ref. No. 0100-511

HSP

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA ~~30308~~ 30365

RECEIVED
JUN 17 1980
CULTURAL RESOURCE
MANAGEMENT TEAM

RECEIVED
JUN 16 1980
DIVISION OF ARCHIVES
History & Records
Management

June 12, 1980

REF: 4SA-EIS

L. Ross Morrell
State Historic Preservation Officer
Division of Archives, History and Records Management
Florida Department of State
The Capitol
Tallahassee, Florida 32301

Dear Mr. Morrell:

Thank you for your letter of May 16, 1980, notifying EPA that the nomination forms for the Carruthers Mound had been signed and forwarded to the Keeper of the National Register. Although we have not yet received a determination of eligibility from the Keeper, we are proceeding with the required consultation under the assumption that the site is eligible.

In my letter to you dated April 29, 1980, concerning the proposed Duette Mine in Manatee County, Florida, I indicated that EPA had applied the Criteria of Effect and the Criteria of Adverse Effect (36 CFR Sections 800.8 and 800.9) to the proposed project. As a result, EPA made a preliminary determination that, although the Carruthers Mound would itself not be mined, the proposed project would have an adverse effect on the Mound due to "isolation from or alteration of its surrounding environment." The Estech DEIS proposed mitigation by archeological excavation to retrieve the data contained in the Mound.

I subsequently discussed the situation with Mr. Don Klima, Southeastern Representative of the Advisory Council for Historic Preservation, who emphasized the Advisory Council's strong preference for preservation whenever possible as opposed to excavation. Therefore, we have renewed our efforts to find a means of assuring the preservation of the site. Under EPA's instructions, the EIS third party consultant has refined the location of the Mound in relation to the proposed mining plan and associated construction activities. Its relative location is described in the attached letter and map.

Since it appears that all mining and associated activities can be kept well away from the site and that the site can be adequately protected from disturbance, EPA concludes that the proposed project will have an affect on

the Carruthers Mound but that the effect will not be adverse. To guarantee protection from disturbance, the following would be imposed as conditions of the NPDES permit:

1. Estech would be required to maintain the mining and construction distances described in the attached letter, with absolutely no activity approaching within 400 feet of the Mound.

2. Estech would be required to erect a clearly marked fence at a minimum radius of 400 feet from the Mound except on the southeastern quadrant which is protected by the preservation of the river and floodplain. Following cessation of mining and construction activities, the fence would be removed to prevent calling attention to the mound.

If you concur with the finding of "no adverse effect" given the imposition of the conditions described, please indicate your concurrence by signing on the line provided below.

Sincerely,

A. Jean Tolman

A. Jean Tolman
EIS Project Officer

Enclosure

State Historic Preservation Officer
for Florida

E.O. 11593

DETERMINATION OF ELIGIBILITY NOTIFICATION

National Register of Historic Places
Heritage Conservation and Recreation Service

Name of property: Carruthers Mound (8-Ma-119)

Location: Bradenton, Manatee County **State:** FL

Request submitted by: U.S.E.P.A. A. Jean Tolman

Date received: 5/29/80 **Additional information received:**

Opinion of the State Historic Preservation Officer:

☒ Eligible ☐ Not Eligible ☐ No Response

Comments:

The Secretary of the Interior has determined that this property is:

☐ Eligible **Applicable criteria:** ☐ Not Eligible

Comments:

☒ Documentation insufficient
(Please see accompanying sheet explaining additional materials required)

Lynn A Beeler
for Keeper of the National Register

Date: June 30 1980

FHR 8-265 2/79

GPO 942 576

E.O. 11593

REQUEST FOR ADDITIONAL INFORMATION TO DETERMINE ELIGIBILITY OF PROPERTY(S) FOR INCLUSION IN THE NATIONAL REGISTER

National Register of Historic Places
Heritage Conservation and Recreation Service

Name of property: Carruthers Mound (8-Ma-119) **State:** FL

Description:

Statement of significance:

After review of the documentation provided, and consultation with SHPO staff, we have determined that there is insufficient information at the present time to establish the eligibility of this site. Currently, all we know is that a small test is reported to have indicated that the mound is artificial.
(See attached sheet for continuation)

Bibliography:

Geographical data -- Acreage:

UTM Reference(s):

Verbal boundary description:

Photographic coverage:

Map coverage:

Other:

Questions concerning additional information may be directed to the National Register staff, telephone 202 343-6401. Thank you for your attention to the above items.

for **Keeper of the National Register**

Date: June 30, 1980

FHR 8-268 2/79

GPO 942 576

Statement of Significance: We know nothing about the function, age, or cultural affiliation of the mound and therefore cannot articulate significance on a site-specific basis of known research potential.

We understand that there are not many intact sites of any kind in this inland area, and on this basis the SHPO feels that the site is valuable, whether the mound represents an habitation area or a burial/ceremonial function. However, given that no cultural materials or features are known to be associated with the site, and the mound has been disturbed by collectors in the past, we believe that the resource has not been sufficiently well-identified to permit evaluation of its research potential.

We would be pleased to receive a resubmission of this request for determination of eligibility when additional information on the content, structure, and function of the mound becomes available.

United States Department of the Interior

HERITAGE CONSERVATION AND RECREATION SERVICE
WASHINGTON, D.C. 20240

IN REPLY REFER TO:

Ms. Jean Tolman
EIS Project Officer
U.S. Environmental
Protection Agency
Region IV
345 Courtland Street
Atlanta, Georgia 30308

Dear Ms. Tolman:

Thank you for your letter requesting a determination of eligibility for inclusion in the National Register pursuant to Executive Order 11593 or the National Historic Preservation Act of 1966, as amended. Our determination appears on the enclosed material.

As you understand, your request for our professional judgment constitutes a part of the Federal planning process. We urge that this information be integrated into the National Environmental Policy Act analysis in order to bring about the best possible program decisions. This determination does not serve in any manner as a veto to uses of property, with or without Federal participation or assistance. Any decision on the property in question and the responsibility for program planning concerning such properties lie with the agency or block grant recipient after the Advisory Council on Historic Preservation has had an opportunity to comment.

We are pleased to be of assistance in the consideration of historic resources in the planning process.

Sincerely yours,

Carol D. Shull

Carol D. Shull
Acting Keeper of the National Register

Enclosure

July 10, 1980

REF: 4AA-EIS

Mr. Robert M. Utley
Executive Director
Advisory Council on Historic Preservation
1522 K Street, N. W.
Washington, D. C. 20005

Reproduced from best available copy.

Attention: Mr. Don Klima

Dear Sir:

Mobil General Chemicals Corporation has applied to this Agency for an NPDES permit for a proposed phosphate mine in Manatee County, Florida. EPA has determined that the proposed mine is a New Source and as such is subject to NHPA review.

In October of 1979, EPA published the Draft Environmental Impact Statement for the proposed project, and in November of 1979 we received the attached comments from the Department of the Interior. Your attention is directed to paragraph one of the second page regarding compliance with 36 CFR Parts 63 and 800.

In accordance with the Department's letter, EPA has been carrying out the prescribed consultation procedures with the State Historic Preservation Officer for Florida. As a result of this consultation, the SHPO has submitted to the Keeper of the Register our request for determination of eligibility for inclusion in the National Register of Historic Places. The subject of the eligibility determination request is a site, known as the Carruthers Mound, located in the proposed project area.

The request for a determination of eligibility was accompanied by the SHPO's statement that in his opinion the property is eligible, and by EPA's statement of agreement with the SHPO's opinion. (Please see copies of correspondence, attached.) The statement of agreement was intended to meet the requirement of 36 CFR Section 63.3, thus qualifying this Agency to receive a written determination within ten working days of receipt of the request. That time frame was not met. Although the request was mailed to the Keeper by the SHPO on May 15, 1980, this Agency received no response from the Keeper until July 7, 1980. On that date, the Keeper notified EPA that the documentation provided was insufficient to make a determination of eligibility.

This Agency is taking steps to provide the additional information needed by the Keeper of the National Register and will insure that a determination is ultimately obtained. However, this delay is especially unfortunate since the permit applicant proposes to preserve the site, and any delay in this

publication and subsequent permit issuance is likely to impose an economic hardship on the applicant. Therefore, efforts to expedite the Federal process at this point seem highly appropriate. In that regard, we wish to invoke certain portions of the Federal regulations. 36 CFR Section 800.4 (a)(4) provides that the Agency Official may initiate a request for the Council's comments simultaneously with a request for a determination of eligibility when the Agency Official and SHPO agree that a property meets the National Register Criteria (as is the case in this instance). This section further states that before the Council provides its comments, the property must be determined eligible for inclusion in the National Register. However, Section 63.3 of 36 CFR provides that, "If the property has not been accurately identified and evaluated, the Keeper will inform the Agency and the State Historic Preservation Officer within ten working days and will recommend that the Agency follow the process set forth at 63.2. Notwithstanding such recommendation, the Federal Agency or the Keeper of the National Register may consider the property eligible for the purpose of obtaining the Advisory Council on Historic Preservation's comments." (Emphasis added.) EPA elects to follow this course of action and, based on the assumption that the Carruthers Mound is eligible, submits this letter as a request for the Advisory Council's comments. Please note the concurring opinion of the SHPO, contained in the attached letter dated June 12, 1980.

EPA in consultation with the SHPO applied the Criteria of Effect to the proposed undertaking and concluded that it might have an effect on the Carruthers Mound. An effort was then made to take all necessary precautions to preserve the site and prevent any adverse effects. The precise relation to the proposed mining activity is shown on the attached map. The mound falls well within an area of the mine site that will not be mined. The limits of mining lie 2,150 feet to the west of the mound, 1,020 feet to the south of the mound and 920 feet to the north. To the east and south of the mound lie the north fork of the Kanatee River and its floodplain which are to be preserved undisturbed. The dragline corridor, pipeline and road right-of-ways occur 620 feet to the northeast of the mound at the closest point. No buildings, roadways, pipelines, excavations or ground disturbance will take place within 400 feet of the mound. The permit applicant has agreed to fence the area in accordance with negotiated specifications to further protect the mound.

EPA proposes to further guarantee that the mound will be protected from disturbance by imposing the following as conditions of the NPDES permit:

1. Estech will be required to maintain the mining and construction distances from the mound as described in the preceding paragraph with absolutely no activity approaching within 400 feet of the mound.

2. Estech will be required to erect a clearly marked fence at a minimum radius of 400 feet from the mound except on the southwest quadrant which is protected by the preservation of the river and floodplain. Following cessation of mining and construction activities, the fence will be removed to prevent calling attention to the mound.

Given the proposed mining plan and the imposition of the described permit conditions, EPA and the SHPO have applied the Criteria of Adverse Effect to the undertaking and have concluded that:

1. Destruction or alteration of all or part of the mound will not occur;

2. A sufficient undisturbed buffer area will remain around the mound that isolation from or alteration of the mound's surrounding environment will be prevented;

3. The undisturbed buffer will also maintain the character and setting of the mound;

4. Deterioration or destruction will not result from neglect; and

5. The undertaking will not result in sale or transfer of the property on which the mound is situated.

Please review at your earliest convenience the documentation provided in this submission and notify this agency if we have satisfied our Section 106 responsibilities.

Sincerely,

A. Jean Tolman
EIS Project Officer

Attachments

cc: Ross Morrell,
State Historic Preservation Officer for Florida

JTolman/ar/7-11-80 (Revised)

Advisory Council On Historic Preservation

1522 K Street, NW
Washington, DC 20005

July 18, 1980

Ms. A. Jean Tolman
EIS Project Officer
U.S. Environmental Protection Agency
Region IV
345 Courtland Street
Atlanta, GA 30308

Dear Ms. Tolman:

On July 17, 1980, the Council received your determination that the issuance of a new source National Pollutant Discharge Elimination System (NPDES) permit for Estech General Chemicals Corporation's Duette Phosphate Mine, Manatee County, Florida, would not adversely affect the Carruthers Mound, a property which may be eligible for the National Register of Historic Places, if certain conditions were placed on the permit (see enclosed EPA letter, dated July 10, 1980). We understand that EPA, in consultation with the Florida State Historic Preservation Officer, has requested the comments of the Council, as provided for under 36 CFR Part 1204.3 (formerly Part 63.3) and the Council's regulations, despite the fact that the Keeper of the National Register has requested additional information in order to make a determination on the eligibility of the mound. In accordance with Section 800.6(a) of the Council's regulations (36 CFR Part 800), the Executive Director does not object to your determination.

As provided in Section 800.9 of the Council's regulations, a copy of your conditioned determination of no adverse effect, along with supporting documentation and this concurrence, should be included in any further assessment or statement prepared for this undertaking in compliance with the National Environmental Policy Act and should be kept in your records as evidence of your compliance with Section 106 of the National Historic Preservation Act and the Council's regulations. Please keep us informed of any further actions that are taken to provide enough information to the Keeper of the National Register for a determination of the eligibility of the Carruthers Mound.

Thank you for your cooperation.

Sincerely,

(for) Jordan E. Tannenbaum
Chief, Eastern Division of
Project Review

constructed modern earthen dams used for water retention have a very low annual risk of failure of approximately 1 in 10,000. The probability of the proposed embankment was estimated to be a factor of 10 lower or 1 in 100,000 because of essentially zero probability of overtopping (the most common cause of dam failures) or earthquakes and because of the strong foundation soils. Waste clays contained in the settling area contribute further to the low risk of failure by sealing the bottom and sides of the settling area, thereby reducing the chances of piping failure.

Typical uranium mill tailings dams are constructed in an altogether different manner and utilize waste tailings for the embankments themselves. Because of substantial differences in construction methods, the risks of failure of the proposed embankment and uranium mill tailings dams are not comparable.

RESPONSE W-80

The hydrogeology of the area of the proposed project is basically a 2-layer leaky-artesian system. The Hawthorne/Tampa formations are the semi-confining unit between the upper, or water-table system and the lower, or artesian system. The leakance coefficient of this unit has been estimated to average about .00005 gpd/ft^3 (Guyton 1976). The annual average head difference between the two systems is 90 feet (DEIS Figure 4.7-2) thereby suggesting a natural recharge of about 0.13 mgd/square mile. This recharge rate is significant over the mine area where there are about 2.1 mgd being recharged naturally.

RESPONSE W-81

The casing length of 150 feet indicated in the DEIS was taken from Guyton (1978). This figure according to Guyton (personal communications, 1980) was a preliminary value used as a minimum for permitting purposes. A letter from Guyton* indicates that

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* Referenced letter is on file at the U.S. EPA, Region IV office, EIS Branch, 345 Courtland Street, N.E., Atlanta, Georgia 30365.

the first well will be constructed through the confining unit into the limestones of the Tampa formation. As Dr. Guyton states in his letter, the recharge of water which does not meet the waterquality standards of the Consumptive Use Permit (SWFWMD, 1978) or the FDER is not being planned.

RESPONSE W-82

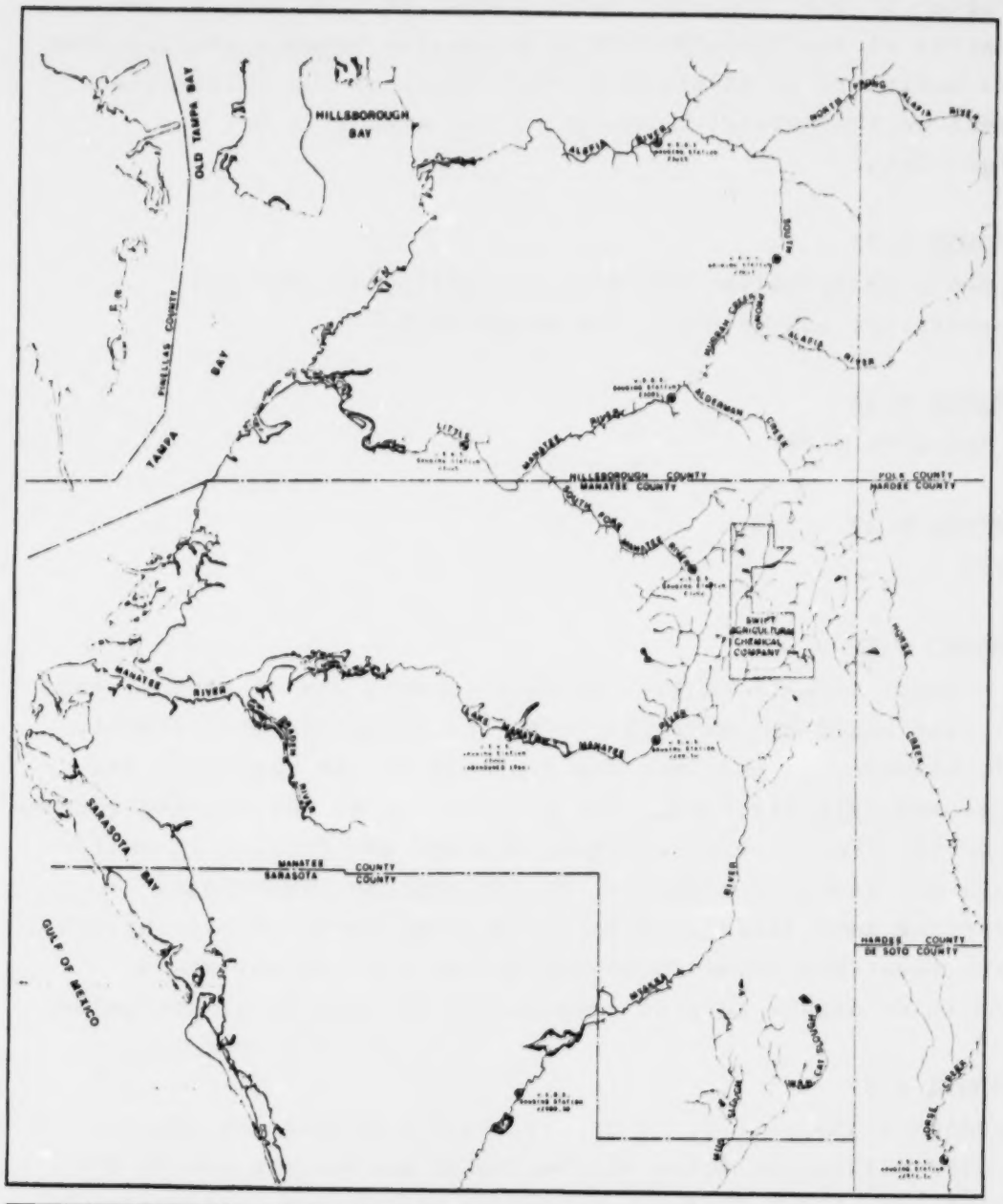
Each of these concerns are addressed in the Consumptive Use Permit. Water quality records are to be provided to the District (SWFWMD, 1978) on a monthly basis. The terms and conditions of this permit prohibit the recharge of water exceeding strict waterquality standards. If violations of the permit are noted, the District may "take appropriate action to protect the resource, including modification of the terms and conditions of this permit." The schedule, location and type of monitoring are included as conditions to the permit.

RESPONSE W-83

Map is provided on following page.

RESPONSE W-84

The two statements may be misleading when not reviewed in perspective. Water levels throughout the area provide proof that there is leakage from the water table to the artesian aquifer. An estimate of the leakance coefficient based on pumping tests and geology is .00005 gpd/ft^3 (Guyton, 1978). Using this value, and the annual average head drive across the unit of 90 feet, an annual average leakance of 0.13 mgd per square mile is calculated (2.1 mgd over the mine area). This is, however, relatively low in comparison to other areas in the state. The recharge amount is about 2.6 inches per year or about 5% of the annual rainfall. Therefore, with regard to the question of these wetlands being prime natural recharge areas, there is no evidence to suggest that these wetlands are locations where surface water and groundwater are significantly interconnected.



RESPONSE W-83
REGIONAL DRAINAGE PATTERN
DUETTE MINE

SWIFT AGRICULTURAL CHEMICALS CORPORATION
MANATEE COUNTY, FLORIDA

NORTH

0 1 2 3
SCALE IN MILES

ARDAMAN AND ASSOC., INC.
SOURCE: U.S.G.S.

The prime factor controlling natural recharge rates is the character of the Tampa/Hawthorne Formation. As long as the integrity of the Tampa/Hawthorne Formation remains and the head drive across it is maintained, the impact of the reclamation project on the natural recharge of the area will be insignificant.

RESPONSE W-85

Section 7 Consultation has been accomplished. For full documentation and details, see Response W-76.

RESPONSE W-86

See Response W-78.

RESPONSE W-87

Agreed

RESPONSE W-88

The comment is well taken. Pasture is only one of several land uses that would be compatible with the reclaimed environment. This, however, is the land use proposed by the applicant and was accordingly assessed. The possibility of engineering surface soils that are friable, properly drained and fertile is well within the economic potential of reclamation technology. Converting some lands into forestry land, particularly in light of the favorable climatic conditions of the region, would minimize or negate adverse impacts due to loss of timber value.

RESPONSE W-89

An economic analysis of timber vs. cattle production was not included within the scope of the impact assessment due to the flexibility of the land use following mining and reclamation. The future land owner may employ the reclaimed land for a variety of different agricultural uses which could include farming, timber production, dairying, ranching, etc. The return of the

existing pine flatwoods to pasture does not preclude the use of this land from timber production.

A present-day economic comparison of the various agricultural uses at this time would not be applicable at the time the land would be available for such use, some twenty years hence.

RESPONSE W-90

Public hunting is not allowed on the property at present, and no plans have been made for public hunting in the future. Most of the riverbottom vegetation with its relatively high wildlife values will be preserved from mining. The increase of aquatic habitats after reclamation will be beneficial to wildlife, including game species. It is doubtful, however, that specific reclamation for wildlife purposes would be less costly to reclaim than what is now planned. In all cases of upland reclamation, the land is first backfilled and/or graded to final desired topography, then seeded to various pasture grasses for soil stabilization purposes. All tree plantings, forage grass plantings, etc., for wildlife purposes would be additive in cost.

RESPONSE W-91

The described inconsistency resulted from a computational error in the data reduction process. The error was discovered within a short time after publication of the DEIS, has been corrected and appears in an Errata Section to the Final EIS.

RESPONSE W-92

Estech has indicated it will cooperate fully with NOS in relocating any geodetic control survey monuments, including providing at least 90 days notice before relocation would be required for any monument. The funding required for relocating the monuments will be provided by Estech, and this financial responsibility will be imposed by conditioning the NPDES permit accordingly.

RESPONSE W-93

The concerns expressed in this comment were confirmed in the report published in November 1979 by the General Accounting Office and entitled "Phosphates: A Case Study of a Valuable Depleting Mineral in America." This report found that, "As presently-mined, high-grade phosphate deposits are being depleted, there is a pressing public need that long-term availability be assured in order to maintain adequate food production... The changing phosphate supply conditions call for a review of Government activities affecting possible new sources of development, potential reduction in national consumption and export policy." The report recommended, as a prerequisite to a national policy and planning process for phosphates, that the Department of the Interior make a thorough review of the Nation's long-range phosphate position and report to Congress on the future availability of phosphates. This review, to be submitted to the Congress by December 1981, would include a comprehensive assessment of the Nation's phosphate reserves, a determination of the extent to which non-economic constraints limit development, a review and evaluation of alternatives to import dependency and a determination of projected phosphate needs. In its official response to the GAO report, EPA supported the conclusions and recommendations and expressed strong interest in participation in the recommended Interior-led review. On March 27, 1980, the Secretary of the Interior responded to Congress with a request that the report date be extended to December 31, 1982. That letter is reproduced on the following page.

RESPONSE W-94

The quality of the water recharged will be analyzed monthly according to the consumptive-use permit granted to Estech (SWFWMD, 1978). The permit contains certain water quality standards which must be met by the recharged water. A violation of these standards may result in the cessation of a part or all of the recharge program. Compliance with the quality

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

Honorable Jack Brooks
Chairman, Committee on
Government Operations
House of Representatives
Washington, D.C. 20515

MAR 27 1980

Dear Mr. Chairman:

We are submitting this letter in accordance with section 236 of the Legislative Reorganization Act of 1970, which requires the head of a Federal agency to submit a written statement of action taken on recommendations made by the Comptroller General. The following recommendations were made in the Comptroller General's Report to the Congress, "Phosphates: A Case Study of a Valuable, Depleting Mineral in America," EMD-80-21, November 30, 1979, pages 49 and 50:

> ...that the Secretary of the Interior make a thorough review of the Nation's long-range phosphate position, and report to the Congress on its future availability, and if appropriate, to suggest legislative actions needed to ensure supply. Such a review should be submitted to the Congress by December 1981 and include the following:
>
> 1. A comprehensive assessment of the phosphate reserves of the Nation and the world. To the extent that this is based on unverified data, the Secretary should judge the reliability of such data and the need, if any, for Government verification of proprietary (source) records.
>
> 2. A determination of the extent to which noneconomic trade-offs, such as environmental needs and other land-use needs, are likely to limit future phosphate development.
>
> 3. A review and evaluation of alternatives to import dependency and assessment of their costs.
>
> 4. A submission from the Department of Agriculture contributing to the comprehensive phosphate assessment by estimating future needs and possible food production alternatives to being dependent on foreign fertilizer sources.

The report also recommends that the Secretary of the Interior, in making these assessments, consult and work closely with specific departments and agencies.

First, we agree with GAO that a "thorough review" of the Department's phosphate reserve estimates should be completed. This review began in

1977 with an intensive study of the Florida phosphate deposits. It is being followed by additional resource, engineering, and recovery cost studies for all other domestic deposits. When this is completed, the Department will be seeking similar information on all foreign deposits. All of this information will be carefully analyzed and incorporated into the Bureau of Mines' Minerals Availability System (MAS). I would also note that this process for studying phosphates resources is being utilized for 33 other critical minerals. It was initiated in 1975 and it is our objective to complete these evaluations for all these minerals by the end of fiscal year 1985.

We also recognize the inexactness of any reserve or resource estimates and cope daily with the problems associated with company, other government, and private data on mineral reserves and resources. However, we believe the statement that the "Bureau of Mines relies too heavily on unverified proprietary data without judging its reliability" is not a complete presentation of the practices of the Bureau's commodity specialists, and is misleading about the general usefulness of the Bureau 's commodity information and the MAS. We are constantly trying to find ways to improve the quality of our mineral information. However, in some cases we will have to continue to rely on information that cannot be fully verified. In such cases, we will continue to use the best means possible to reduce the risks of using this information. It is important to recognize that there is no mandatory reporting for phosphate and certain proprietary data cannot be verified. In all cases, however, the general reliability of the sources providing the data can and will be assessed.

Second, concerning the review of the impacts of environmental and land-use decisions on phosphate development, I would call your attention to the recent study completed by the National Research Council in accordance with Section 709 of the Surface Mining Control and Reclamation Act of 1977. The Council established a special task force to study these and other phosphate-related issues. With this study as the primary source, the Council on Environmental Quality will be making a report to the President and the Congress. This Department is working very closely with CEQ on this report and any legislative recommendations it might make.

Third, on the issue of a review and evaluation of alternatives to dependency on imports and assessment of their costs, the report states that "given the projected demand and supply for the next 20 years there is no projected phosphate shortage." This is consistent with the Department's most recent estimate that the United States will continue to be a net exporter of phosphate until at least the year 2000. Additionally, just as long-range forecasting of projected scarcities is at best uncertain (GAO report, pages 13-14), so are long-range estimates of their alternatives and costs.

The report discusses one significant alternative, which is the development of lower grade phosphate resources. While the costs of developing these deposits are at best estimates, it should be noted that they are based on existing technologies, which in all probability will improve considerably during the next 20 years. As they improve, there is reason to believe that some of the existing lower grade deposits could be mined economically, which, when combined with higher prices, is likely to extend our net exporting position well beyond the current 20-year projection. Nonetheless, the issue of costs and alternatives to import dependency needs to be better understood and the Bureau of Mines is scheduled to begin to look at these issues in January 1981 as part of an analysis of the country's long-range phosphate position. This analysis will utilize the information by the MAS.

Fourth, on the issue of estimated phosphate needs for agricultural production and alternatives to depending on foreign fertilizer sources, we will soon make a request to the Department of Agriculture for such a report.

In response to other issues, I would like to make the following comments. You can be assured that we will work closely with other departments and agencies. It is our view that no new legislation is necessary to ensure a continued and reliable supply of phosphate for all of our domestic needs. However, regarding the recommendation that the Department's comprehensive assessment of phosphate reserves be completed and submitted to the Congress by December 1981, we would ask for an extension. We are currently scheduled to complete our assessment of foreign deposits in fiscal year 1981. Thereafter, it is critical that we carefully analyze all our domestic and foreign data to determine what Federal actions should be considered to ensure an adequate supply of this mineral. Accelerating these planned activities would reduce our capacity to conduct similar studies for higher priority minerals such as aluminum, chromium, cobalt, and copper where we have varying degrees of foreign dependency. Since there is no projected shortage of domestic phosphate, we would recommend that a report to the Congress be submitted by December 31, 1982, rather than 1981 as recommended by GAO.

I hope this information is helpful. If you have any questions, please do not hesitate to let me know.

Sincerely,

Cecil D. Andrus

SECRETARY

provisions of this permit will effectively eliminate concern about degradation of water quality within the Floridan aquifer.

RESPONSE W-95

The applicant proposed to control total project sulfur dioxide emissions to less than 50 ton per year, a level which has been determined to produce receptor concentrations less than PSD levels of significance. In the course of PSD regulation development, each criterion has effectively been an incentive for the application of innovative pollution control methods and equipment. In this instance, an extra level of control is undertaken at an increased capital and operating cost that can be justified by the 3.0 million ton per year mining rate. Disadvantages accompanying a 1.5 million ton per year mining rate would suggest an expenditure for a less costly pollution control system adequate to satisfy the same 50 ton per year emission-based incentive.

RESPONSE W-96

The segment of the East Fork Manatee River proposed by Estech for mining was found to be a Category 1 wetland (DEIS, p. 176), i.e., not to be mined. The agency felt all Category 1 wetlands should be preserved as these streams and associated wetlands provide an essential synergistic support to the regional ecosystem and that mining in such areas would have an unacceptable adverse impact. The Case 2 plan, however, excluded all forested swamps from mining regardless of Category or ecological significance. Total and complete preservation of all other forested wetlands, regardless of Category, would have led to a significant loss of nonrenewable phosphate resources although impact mitigation through adequate restoration was a viable option. Therefore, the optimum resource recovery alternative was found to be between Case 1 and Case 2 as reflected by the proposed agency action.

We are willing to allow Estech to restore Category 2 wetlands and will critically evaluate the results of their attempts.

RESPONSE W-97

See Responses W-1, W-2, and W-15.

RESPONSE W-98

The concern for "ambient radiation" is not well defined in the comment. The expression was probably meant to imply the increase in "ambient" gamma radiation exposure rates due to the near surface radionuclides after reclamation and return of the land to a productive and habitable use. The "ambient" gamma radiation levels on the undisturbed site have been measured and reported. The various reclamation techniques will most certainly increase the "ambient" gamma radiation exposure rate. The radioactive series responsible for this elevated rate do have long half lifes (or parents with long half lifes) in excess of 1000 years.

The report, Radiological Environment, attempted to estimate the expected increases in gamma exposure rates. The average terrestrial gamma radiation for the site, before mining, would produce a background rate of about 5.1 μR/hr or 45 mrem/year for an individual remaining on the site 24 hours per day. This is lower than the national average of 84 mrem/year.

After reclamation, the site average will increase to about 8.8 μR/hr without any credit for the low activity overburden expected to be used as the final reclamation layer. The added increment should actually be much less than 32 mrem/year for an individual standing outside for 24-hours per day. The total exposure potential (baseline plus increment) will be less than 77 mrem/year or about 93% of the national average background. Residence time outside, shielding by concrete slabs, roads and driveways, and other environmental parameters will tend to decrease the added increment.

By comparison, the single most important man-made radiation exposure to the population of the United States is by medical diagnostic procedures. This exposure has tended to increase each year with the current level expected to be in excess of 72 mrem/year.

RESPONSE W-99

It is very likely true that follow-up studies of possible health effects on phosphate workers are more difficult, both logistically and statistically, in the case of temporary employees as opposed to regular employees. However, we know of no evidence to suggest that Estech or any other phosphate company makes it a practice to hire temporary employees for hazardous jobs. The phosphate industry in general does not staff to handle anything other than routine maintenance and operating requirements. Outside firms are hired during major maintenance outages. As periods of peak production or shipping occur, temporary workers are hired to relieve manpower shortages. These workers would not be subject to any more hazards than are regular company employees.

RESPONSE W-100

Controlled particulate emissions from the proposed phosphate rock drying and handling operations are expected to contain less than two percent of particles greater than 2.0 micrometers aerodynamic diameter. Wet scrubbing collection systems rely on aerodynamic properties of both the particle and water droplet collection media to achieve removal, and selectivity of removal is greatest for the largest diameter particles present in the gas stream.

At the conclusion of the mining/beneficiation operation, the pebble rock and concentrate products are finally separated from water which has been used as a means to transport the material. Upon separation from the water slurry, the liquid contains most of the non-adhering fine particulate matter. In fact, this fine particulate is exceedingly difficult to remove from the liquid and results in the need for sedimentation facilities to recover recycle process water. Subsequent mechanical handling of wet rock (13 plus percent moisture) produces some attrition of the product prior to introduction as feed into the fluidized bed rock dryers. In the dryer the product is supported by heated

gas flow and is in a fluid-like state which tends to minimize further fragmentation and abrasion.

A vigorous sieve size analysis was performed on dried pilot plant feed rock from the Duette site and the test results suggest that concentrate, the greatest portion of the proposed production, could be expected to produce relatively little fine particulate below 40 micrometers diameter in the rock drying process. However, a small balance of the product, pebble rock, includes clay which is difficult to remove in the beneficiation (mechanical agitation) process. In the drying (heating) process, included clay is embrittled and fragmented into very fine particulate matter. Therefore, major components of the controlled emissions from the dryers would be a mixture of natural sedimentary clay/sand and phosphate fines mixed with fine ash from the fuel combustion process. Predominating substances originating in the mine matrix, are characterized in the DEIS radiological section (p. 112, Table 4.11-3) and would be expected to exhibit Radium-226 activity levels comparable to or less than values listed for concentrate and pebble rock. Components of the matrix are otherwise relatively inert chemical species.

RESPONSE W-101

Environmental Impact Analysis must document impacts and examine environmental effects of the proposed activity. The analysis of effects is typically in relation to existing environmental regulations which are based on extensive scientific and/or recent technical information which has received general acceptance by the scientific community. The existing NAAQS were designed, in principle, to protect the more susceptible population from effects of more harmful industrial suspended particulate substances. An assessment based upon differences between industrial effects, or some adjustment to the applicable ambient air quality standards based upon generic industrial effects, is not within the scope of the EIS process. Whether or not available morbidity and mortality investigations have

conclusively established a need to develop generic source standards is not clear at this time.

RESPONSE W-102

Refer to Response W-55.

RESPONSE W-103

Refer to Response W-6.

RESPONSE W-104

The exact concern that Comment W-104 was intended to express is difficult to interpret. The resource document defines which of the 13 daughters of U-238 are alpha, beta and gamma emitters. The document did not attempt to define these emissions since their characteristics are readily available in the literature. Gamma radiation is the more penetrating and was therefore discussed under the headings of "Terrestrial Gamma Radiation" and "Alteration of Terrestrial Gamma Radiation".

The terms "alpha emissions...is soluble" and "ore...emission" used in the comment, have limited applicability. The alpha particle has an extremely limited range, effectively shielded by a sheet of paper. After its energy is dissipated, it becomes a normal helium form which is soluble in water to a limited degree. Exposure rates to humans from "uncovered ore" is insignificant.

RESPONSE W-105

The comment is correct in that the complete recurrence of a "natural" vegetation association on reclaimed mined land is highly improbable. As also stated, it is probable that restored of hardwood swamps will take 50 or more years to mature. The technology is being developed to establish selected plant communities on mined land that would, with time, approximate natural associations in function, even though species composition may not be exactly the same.

RESPONSE W-106

Regarding EPA's policy for handling hazardous wastes produced by the phosphate industry, on May 19, 1980, EPA's Hazardous Waste and Consolidated Permit Regulations, 40CFR Part 260 through Part 265, were published in the Federal Register (Vol. 45, No. 98). In these regulations, the only phosphate industry waste excluded from listing as a hazardous waste is "mining overburden returned to the mine site". Other phosphate industry wastes, including slimes from phosphate ore beneficiation, leach zone overburden and discarded phosphate ore from surface mining, are proposed to be listed as hazardous wastes in additional regulations scheduled for promulgation this fall. In the meantime, the phosphate company must determine if its clay slimes or other phosphate wastes are a hazardous waste by testing the waste according to the methods set forth in Subpart C of 40CFR Part 261, Characteristics of Hazardous Waste. (The characteristics identified are ignitability, corrosivity, reactivity and toxicity.) If a waste is listed or otherwise identified as hazardous, the Hazardous Waste and Consolidated Permit Regulations will provide for its "cradle to grave management".

RESPONSE W-107

The design, construction and maintenance of the proposed clay settling area embankments will be in accordance with the high standards of safety required by Chapter 17-9 of the Rules of the Florida Department of Environmental Regulation. Since 1972 when the revision to Chapter 17-9 was promulgated, no settling area embankment has developed a serious problem.

Historical evidence indicates that northeastern Manatee County is not a sinkhole prone area. In that the planned drawdown created by the water supply system is a decrease in artesian pressure and not a dewatering of the aquifer, the withdrawals will not make the area more prone to collapse. The drawdown caused by the withdrawal will be small in comparison to the existing normal fluctuations of the water levels in the Floridan Aquifer.

RESPONSE W-108

The maximum possible precipitation from a storm event on the area in question is 31 inches (NOAA, 1956). One inch of rainfall on the Duette site would result in an increase in the level of the settling area of slightly more than one inch (Appendix D, Water Quality Resource Document). In view of the fact that the settling area will be designed so that a minimum freeboard of 5 feet will be maintained, the probability that the settling area will be overtopped is essentially zero.

The effect of a clay settling area dam failure on fluoride levels in Lake Manatee was addressed in Section 5.3 of the Surface Water Quality Resource Document. In summary, the 1,000 acre-feet of clear water initially released from the clay settling area in the event of a dam failure would contain enough fluoride to raise the fluoride concentration in Lake Manatee from an average of 0.45 mg/l to approximately 1.0 mg/l. In the long-term, fluoride would be gradually expelled from clays deposited in the Lake at a rate sufficient to raise the mean fluoride level in the Lake by more than 0.004 mg/l.

While some dilute sulfuric acid will be used in the beneficiation process, its influence on the pH of waters in the plant recirculation system will be offset by the simultaneous use of sodium hydroxide. The net results will be that waters discharged from the clay settling area - either scheduled or as a result of a dam break - will generally be alkaline or at most slightly acidic. Mean pH levels measured in the North and East Forks of the Manatee River (Table 2-I, Surface Water Quality Baseline Resource Document) ranged from 6.3 to 6.6 compared to a minimum pH of 6.4 measured in the Estech Silver City Mine effluent between June, 1976 and June, 1978 (Table 2-B, Surface Water Quality Impact Resource Document).

RESPONSE W-109

State permit applications and additional Federal permit applications for activities at the proposed Duette Mine are in

various stages of development and are expected to be completed by October, 1980. With regard to local land use and zoning matters, Estech is involved in ongoing proceedings relating to state requirements for local review and approval of a "development of regional impact" (DRI). In November, 1978, the Tampa Bay Regional Planning Council recommended approval of Estech's application for development approval subject to specific conditions. In February, 1979, the Manatee County Planning Commission recommended approval of the DRI application subject to conditions and of the application for special zoning exception filed by Estech. In August, 1979, the Board of County Commissioners of Manatee County refused to grant the special exception under its zoning law and, on the basis of this refusal, denied Estech's application for development approval. Estech is currently pursuing judicial and administrative remedies to set aside this decision and to obtain necessary local government approval for the project.

RESPONSE W-110

The cumulative effect of the phosphate mining industry has also been recognized by EPA as a very important consideration. Regulations for implementing the National Environmental Policy Act provide a mechanism for assessing the effects of a number of related actions on a geographic area (40CFR Section 1502.4). EPA employed that procedure when it began in 1976 the preparation of the Central Florida Phosphate Industry Areawide EIS. Its purpose was "to analyze the cumulative, interrelated impacts of the present and proposed phosphate development in central Florida.... through a comprehensive regional environmental assessment and impact statement...." The Areawide FEIS was published in 1978. Subsequent site specific EIS's, of which Estech is the first published, are based upon and take full consideration of the information developed in the Areawide EIS, including the cumulative effects of all projected mines. The Areawide EIS may be obtained by ordering from the National Technical Information Service, Input Branch, 5285 Port Royal

Road, Springfield, Virginia 22161. Cumulative effects of the phosphate industry are addressed in Volume I, and page 2.5 of Volume I discusses the relationship between the Areawide EIS and site specific EIS's.

RESPONSE W-111

The standard concerning limitations on conflict of interest, as well as full disclosure pertaining to the contractor's stake in the outcome of the project, is imposed under subsection 1506.5(c) of the CEQ Regulations. Before initiating the Estech DEIS preparation, EPA conducted a careful inquiry into CCI's qualifications and satisfied itself that CCI was a qualified and objective consultant for the purpose of preparing the third party EIS. No information has been brought to light since that time which causes EPA to revise its determination as to CCI's qualifications and objectivity.

RESPONSE W-112

The DEIS public hearing is an obligation EPA must fulfill in carrying out the requirements of the NEPA and is distinct from the State of Florida Development of Regional Impact process. The latter, incidentally, is not a judicial process as was stated, but rather is an administrative process instituted by the State of Florida.

RESPONSE W-113

Please refer to Response W-2 concerning rock drying and Response W-11 concerning the elimination of above-ground slime disposal areas.

RESPONSE W-114

The DEIS is correct in stating that the operation will be "self-sufficient" in terms of community services and facilities. Estech has no direct call for services to be provided by tax supported public service institutions. Estech will not be internally equipped to provide emergency protection against

catastrophic occurrences. In the rare event that an emergency of the magnitude that occurred at IMC chemical plant should take place at the Estech mining and beneficiation site, it is expected that the annual ad valorem tax (approximately $1.98 million) should be adequate to prevent additional tax money expenditures.

RESPONSE W-115

Please see Response W-93. The cited GAO report also recognizes the potential for an OPEC-type phosphate cartel, and EPA is on record in support of that report. We are also in agreement with the comment that the future export-import situation of this country should be a matter for consideration as well, when examining actions which are currently favorable to the Nation's balance of payments.

RESPONSE W-116

Estech General Chemicals Corporation is required by Florida statute and further has agreed to strict inspection and monitoring of dam design and construction.

Construction of the embankment for the initial settling area will be inspected on a daily basis by a representative of the design engineer. The design engineer will be in close contact with the construction, and prior to the reservoir being put into operation, the engineer will make a thorough inspection of the embankment and the spillway structures to determine that they meet the design specifications.

Prior to using the settling area, monitoring stations will be installed around the perimeter of the embankment. These monitoring stations will consist of clusters of piezometers to measure the seepage pattern within the embankment and through the foundation. Furthermore, the quantity of seepage discharge from the drainage system will be monitored to detect any abrupt changes in the quantity of seepage.

While the settling area is in operation, the design engineer will review the results of the monitoring program and the

inspection reports prepared by the Estech personnel who will be responsible for weekly inspections of the embankments and spillway structures. These inspection personnel will be instructed and trained by the design engineer. At least once per year and probably several times during the first year of operation, the engineer will make periodic inspections of the embankments to detect any evidence of uncontrolled seepage, sloughing, or erosion which would indicate that the embankments are not performing as designed.

Estech's dam protection procedure includes:

- Testing prior to storing clay by filling it with clear water. This will allow engineers to assess the character of the dam and determine any corrections that might be required in the design.
- Inspections every shift (8 hrs.) by the operating crews.
- Inspections by the Area Superintendent each day.
- Inspections by the Company Engineer each week.
- Inspections by the Design Engineer at least once each three months.
- All people who have responsibility for dam inspection will attend classes given by the Design Engineer.

RESPONSE W-117

The comment with regard to the meaning of "wilderness" is correct. The use of the term "wilderness" is used to convey the thought that the area will likely afford isolated nesting and roosting habitat for herons, egrets and other birds which frequently utilize similar abandoned mine-pit lakes with spoil rows in the region.

With regard to habitat restoration efforts proposed by the applicant, please refer to Responses W-68, W-71, W-105, W-123 and W-124.

RESPONSE W-118

Please see Response W-106. The hazardous waste regulations to be promulgated this fall are expected to address the radioactive as well as chemical nature of phosphate industry wastes.

RESPONSE W-119

Many techniques for improved dewatering of clays have been tested and evaluated in order to develop methods of waste disposal that would eliminate conventional "slime" ponds and enhance rapid land reclamation at or near original ground level.

Three methods were developed that provided effective dewatering. Phosphate companies have continued to test these methods and develop plans for their implementation. One of the methods, the sand-spray technique developed by Brewster Phosphates, encountered operational problems and has not been used by any other company. The other two methods, termed flocculant-thickener and dredge-mix, have been extensively evaluated in pilot plant and semi-works scale testing. At least eight mining companies are proposing to use one of these methods, which represent the best available technology for disposal of this type of waste material.

Estech plans to use the flocculant-thickener method of clay dewatering. The flocculant-thickener process lacks several adverse aspects of the sand-spray process, which was developed by Brewster Phosphates and has encountered operational difficulties. In the operation of the sand-spray process (Brewster), dilute clays from the plant are placed into mined-out areas for initial settling. After a period of several months, when the clay has reached a solids content of 12 - 15%, a floating pipeline equipped with spray nozzles is used to sprinkle tailings sand over the clay. As the sand rains down over a large area, it slowly settles through the pre-thickened clay, resulting in substantial additional release of water.

Although the sand-spray method has proven very effective in dewatering the clays, allowing land reclamation to restore the approximately original ground contours, several operational problems appear to be inevitable with the method. First, the timing is very critical in order for the method to succeed. Unless the clays are at the right consistency, the sand spraying will be ineffective. If the clays are too dilute, the sand will

fall through to the bottom, resulting in little dewatering and not producing a sand-clay mixture. If the clays are too thick, the sand will build up on top until failure results, causing the raft of sand to end up somewhere within the clay, but again resulting in little dewatering or sand-clay mixing.

As mining proceeds and the types of clays vary, it becomes very difficult to use past experience to project just when will be the right time to spray sand on the clays. And, since the plant is producing sand tailings on a continuous basis, they need to be sprayed on a continuous basis, whether the clays are ready or not.

Second, unless the ore body is very uniform, it becomes increasingly difficult as mining proceeds to leave mine cuts that are the proper size and shape for uniform distribution of the sand by spraying. Areas that are not reached by the sand remain as soft layers of clay, difficult to reclaim.

Third, because the clay solids content that is produced by natural settling varies with depth, it is generally not possible to have an entire profile of settled clay that is at the right consistency for spraying. If the middle third of the profile is in the right solids concentration range, then the bottom third will be too thick and the top third will be too dilute. What this means is that the sand will be retained in the middle third of the profile, with little sand-clay mixture in the top or bottom thirds. The lack of sand in the top third results in less dewatering of this material. The thin clay layer at the top, which may be 10 feet or more in thickness, will be more difficult to reclaim than a sand-clay mixture.

The flocculant-thickener method to be used by Estech, dilute clay slimes at approximately 3% solids are pumped from the beneficiation plant to mechanical thickeners where a chemical flocculant is added and the clays rapidly dewater to 15 - 18% solids. Sand tailings from the plant are added to the thickened clay, either directly at the thickener or alternatively at a

downstream mixing station. A homogeneous mixture of sand and clay results. This mixture at about 35 - 40% total solids content is pumped to mined-out areas for backfill. If the clays are within the specified solids content range, the mixture does not separate and a uniform sandy clay soil results. The mixture continues to consolidate under self-weight for several years in the mine cuts.

In order to achieve reclamation at or near original ground level, the sand-clay mix must be placed initially at some height above original ground, so as to allow for subsidence that will occur as it consolidates. Refilling of an area after some consolidation occurs may be desirable in order to limit the height to which material must be placed. The height to which the mixture must be placed depends upon several factors, including the depth of the mine cut, the rate at which it is filled, the permeability and compressibility of the clay, the ratio of sand to clay in the mixture and the number of refills that the area can receive.

All of these parameters can be put into computer programs which have been developed to simulate the filling and subsequent consolidation of the sand-clay mix. For the Estech Duette Mine site, the results obtained indicate that the mixture will consolidate back to original ground if it is placed initially to a height of about 18 feet aboveground and refilled twice during the five-year reclamation cycle. Temporary retaining dikes will be placed around each reclamation unit and subsequently leveled as part of final grading prior to revegetation. (See also the Supplemental Analyses Section, Evaluation of Sand-Clay Disposal Height, this document).

The flocculant-thickener method of clay dewatering has several advantages. It is a controlled process that can be easily monitored and adapted to changing conditions. It produces a consistent homogeneous sand/clay mixture at an optimum solids content. The ratio of sand to clay can be controlled as desired. The mixture can be pumped, without segregating, to any desired

point where it is placed into mine cuts as backfill for rapid land reclamation. Along with the dredge-mix technique, it represents the best available present technology for phosphatic clay waste disposal.

Response W-120

The only emissions of concern with the proposed project for which there are existing standards are sulfur oxides and particulate matter. The existing standards are based on criteria developed by the U.S. Department of Health, Education and Welfare - Public Health Service and Consumer Protection and Environmental Health Service and published in January 1969. The criteria, in turn, were established as a result of a number of studies and tests of the effects of these pollutants on materials, vegetation, animals and man. The studies, fully described in the documents, "Air Quality Criteria for Particulate Matter" and "Air Quality Criteria for Sulfur Oxides," considered health effects on different age groups including schoolchildren and the elderly (National Air Pollution Control Administrative Publications, Nos. AP-49 and AP-50). The emission standards which were subsequently adopted were set at levels to protect the most sensitive element of the population.

RESPONSE W-121

Mining occurs at an average depth of 50 feet and a maximum depth of 100 feet below the surface (page 56, DEIS). The surficial soils (0' - 20') and the upper part (approximately 60') of the Hawthorne/Tampa formation will be restructured. The remaining 240 feet of the Hawthorne/Tampa formation will not be disturbed.

The reclamation program calls for the use of a sand-clay mix which is hydraulically similar to the upper layers of the Hawthorne formation, thus, in effect, replacing the disturbed portion. Vertical recharge and water holding characteristics of the shallow groundwater system is expected to return to baseline conditions after reclamation are complete due to the

fact that the vertical permeability of the Hawthorne/Tampa formations is the controlling factor.

RESPONSE W-122

The impact of mine pit dewatering was mentioned on pages 130-131 in the DEIS, and elsewhere in the baseline documents. It was concluded that the impact would be negligible or at least short-term with regard to the natural communities. The buffer zone between the mine pits and the wetlands that are to be preserved will be wide enough so that the water table will not be lowered substantially in those wetlands. Only one side of a stream will be mined at one time, thereby maintaining the continuity of the groundwater aquifer on at least one side of the stream at any given time.

RESPONSE W-123

The comment correctly points out that steep-sided lakes are not as desirable as those with productive shallow areas. However, "The lakes on the Swift (now Estech) site will be contoured to provide shallow shelves (less than six feet deep) along their margins and around islands within the lakes. The shallow areas will occupy approximately 20 percent of the surface area of the lakes and are expected to be colonized by emergent vegetation. These areas will provide habitat for many species of birds... Small fishes and invertebrates will find refuge among the emergent vegetation, and amphibians nearby will breed there."

Steep-sided phosphate pits are often productive sport fishing lakes. Because of the lack of shallows, phytophankton forms the basis of food webs in these systems. The additional habitat created around the margin of lakes at the Estech mine promises to provide excellent, productive fishing lakes. Water hyacinths should not be a problem unless introduced into these lakes. For further information see:

E. Crittenden, 1965. Florida Phosphate Pits for Managed Public Fishing Areas. Proc. 17th Anm. Meeting Southeastern Assoc. Game and Freshwater Fish Comm., 1963.

G. W. Bennett, 1970. Management of Lakes and Ponds. Second Ed. Van Nostrumel Ranhold Co., N.Y.

RESPONSE W-124

If the mine were to be abandoned without reclamation, as was generally the case before mandatory reclamation, then the comment may be correct. The reclamation procedures proposed by Estech will prevent such an occurrence on nearly all parcels of the property after mining. One exception is the "wilderness" area at the mine-pit lake on the north end of the property.

RESPONSE W-125

Subsequent to the promulgation of the DEIS and the November 1979, public hearing several elements of the documents have received expanded discussions. In preparation of the final EIS responses to comments regarding soils, timber production, land use and other agriculturally related issues (W-68, W-69, W-87, W-88 and W-89) have been developed which may be helpful to the agricultural community.

RESPONSE W-126

Personalized and direct exchanges were an integral part of DEIS preparation throughout various stages of data development. Local and regional agencies were consulted in developing information on land and water, forestry, economics and roads as well as other elements. In addition to these inputs during the preparatory stages, numerous local and regional agencies were asked to comment on the DEIS and its Resource Documents. (See the Public Participation Section of the FEIS.)

RESPONSE W-127

Whether or not there remains any question concerning the accuracy of work performed by the preparer on unrelated activity, the work performed in this study was subjected to independent engineering review by EPA and approved engineering contractors and found acceptable. Here again, as stated in Response W-51 and W-52, the PSD review procedure assures the accuracy and completeness of the EIS air quality analysis.

With regard to the referenced document or Recommended Order to the Secretary of the Florida Department of Environmental Regulation by the State of Florida Division of Administrative Hearings (March 5, 1979), the computations were viewed from the perspective of technical information that was not generally available to the scientific community until after the Agrico Construction Permit Applications were filed.

The questionable emissions were not omitted from consideration, but were aggregated into a single estimate, much in the same manner that the supporting research was conducted and the resulting data were used to develop an estimatation methodology for generic storage pile operations in the EPA compilation of emission factors (AP-42).

Expert witnesses from the Florida Department of Environmental Regulation testified that the estimated emissions were reasonable after a re-examination which included a field visit and visual observation of material being handled at the originating seaport.

RESPONSE W-128

See Response W-3.

RESPONSE W-129

Note is taken of the comment letter from Mr. Joseph E. Davis, Estech General Chemicals Corporation.

RESPONSE W-130

Placing a moratorium on phosphate mining and processing operations is outside the regulatory authority of EPA. Also, see Responses W-110 and W-93 concerning cumulative effects and phosphate resource protection, respectively.

5.2 HEARING TRANSCRIPT AND RESPONSES TO TRANSCRIPT COMMENTS

UNITED STATES OF AMERICA
ENVIRONMENTAL PROTECTION AGENCY
REGION IV

- x

A Public Hearing:

DRAFT ENVIRONMENTAL IMPACT STATEMENT

ESTECH GENERAL CHEMICALS CORPORATION
DUETTE MINE
MANATEE COUNTY, FLORIDA

- x

Time: 7:30 p.m.

Date: November 28, 1979

Location: Manatee Junior College
Bradenton, Florida

-oOo-

BAY PARK REPORTING COMPANY
COURT REPORTING
33 FOURTH STREET NORTH
ST. PETERSBURG, FLORIDA 33701
(813) 823-8388

APPEARANCES:

THE CHAIRMAN:

CHARLES PERRY
Regional Counsel
Environmental Protection Agency
Atlanta, Georgia

THE PANEL:

JEAN TOLMAN
Project Officer
Atlanta, Georgia

ROBERT HOWARD
Chief of EIS Preparation Section
Atlanta, Georgia

JOHN HAGAN
Chief of EIS Branch
Atlanta, Georgia

MICKEY BRYANT
Environmental Administrator,
NPDES Section
Florida Department of Environmental
Regulation
Tallahassee, Florida

SPEAKERS	PAGE
Joe Davis	9
William Hamilton	12
Richard Nelson	32
Jeffry Lincer	37
Robert Lyman	54
Fred Duisberg	58
Mary Jelkes	61
Mrs. C.G. Fernald	64
James Hunter	66
Mrs. Gloria C. Rains	68
Mary P. Greer	85
Archie E. Brumfeld	87
Hilda E. Quy	88

P R O C E E D I N G S

(Whereupon, at 7:35 p.m. the hearing was called to order)

MR. PERRY: The meeting will come to order, please.

My name is Charles Perry, and I'm the Regional Counsel for the Environmental Protection Agency, Region IV, in Atlanta, Georgia.

The Regional Administrator of EPA, Region IV, Mr. John White, has designated me to conduct this hearing tonight. It is, as the Notice states, a hearing for an NPDES permit, pursuant to the Clean Water Act of 1977, for Estech at their mine, their Duette phosphate mine.

I'd like to introduce the members of the panel here with me tonight.

On my far left is Ms. Jean Tolman who, I understand this is her first day with EPA, and she will be a Project Officer on projects such as this in the future.

To my immediate left is Mr. Robert Howard, who is the Chief of the EIS Preparation Section for Region IV, and to my right is Mr. John Hagan, who is Chief of the EIS Branch, and to my far right is Mr. Mickey Bryant, who is with the Florida Department of Environmental Regulation.

Tonight's hearing is concerned with the possible action by EPA with respect to the Duette phosphate mine, a new facility proposed by Estech General Chemicals Corporation.

Estech has applied for a National Pollutant Discharge Elimination System permit for this facility, and throughout the night this will probably be referred to as an NPDES permit.

The issuance of this permit for a new source mine is a federal act requiring compliance with the provisions of the National Environmental Policy Act of 1969.

This act requires a federal agency to prepare an Environmental Impact Statement whenever the agency proposes to take a major federal action significantly affecting the quality of the human environment.

Accordingly, EPA has commissioned the preparation of an Environmental Impact Statement for this facility. The draft of this statement has been prepared, and notice of its availability was published in the Federal Register.

This hearing is for the purpose of receiving comments on the Draft Environmental Impact Statement for the proposed issuance of a National Pollutant Discharge Elimination System permit and consideration for state certification of that permit. Under Section 401 of the Clean Water Act, the State of Florida will be requested to certify that the proposed NPDES permit will not cause a violation of the Florida Water Quality Standards, and we have the presence of Mr. Bryant from the State here tonight.

Although no decision has yet been made, EPA tentatively

proposes to issue an NPDES permit. The proposed permit contains limitations on the amount of pollutants that will be allowed to be discharged into waters of the United States and was drafted in accordance with the provisions of the 1977 amendments to the Federal Water Pollution Control Act, which is now commonly known as the Clean Water Act, and other lawful standards and regulations.

This statute created, or its predecessor created, the National Pollutant Discharge Elimination System. It's a national permitting program to control the discharge of pollutants into the nation's waters.

The exclusive goal of the Act is the elimination of discharge of pollutants by the year 1985. To achieve this goal, EPA, or the states if they have received authority from EPA to administer the NPDES permit, will issue permits to every waste water discharger setting limitations and controls on the discharge of pollutants.

This Act requires very strict limits to be imposed for new sources, such as the Duette Mine, and further the permit requires compliance with these limits on the initiation of the discharge.

Let me emphasize at this point that the NPDES permit is the basic enforcement tool for the control of water pollution, and the NPDES permit imposes strict legally-

enforceable limitations on the discharger. Once the permit is issued, the discharger is legally bound to meet the requirements of the permit, and any violation can subject the permittee to criminal or civil penalties.

The pollutant limitations and other conditions of the draft permit are tentative and are open to comment at the hearing here tonight.

We have made available for reviewing here this evening a copy of the Draft EIS, which was at the front desk when you registered. Copies may also be obtained by leaving your name with one of us, and we will mail you a copy when we return to Atlanta.

The Draft EIS, as well as the other relevant documentation and all comments received here tonight or submitted in writing within approximately two weeks of tonight, will be a part of the administrative record concerning the permitting of the Duette Mine.

The information in the record will be used to determine the environmental compatibility of the permit issuance and to prepare a final NPDES permit. This permit would be included in the final impact statement.

In addition, you should be aware that all the substantive comments from the public on the Duette Mine and the Draft EIS, whether received here tonight or

transcribed for the record and received on a later date, will be summarized and addressed in the final impact statement.

As I stated, to my far right is Mr. Mickey Bryant of the Florida Department of Environmental Regulation. I would ask at this time if he'd care to make any opening statements.

MR. BRYANT: Nothing, other than I'd like to welcome everybody here on behalf of Secretary Varn of the department.

I'm here to listen, listen to your concerns or listen to anything that you may feel are shortcomings in the EIS, to listen to anything the public might want to present that might affect our certification or consideration on the certification of this project.

MR. PERRY: Thank you, Mr. Bryant.

With that, sort of to set the stage for what we're here for tonight, I would like to turn the program over to Mr. John Hagan, who is the Chief of Region IV's EIS Branch, and allow him to give you a brief recitation of what the permit is all about and what the EIS is all about.

John?

MR. HAGAN: Thank you, Charlie.

At this time, without making any particular opening remarks, I would like to call on Mr. Joe Davis, who is the

Manager of Projects for Estech General Chemicals, and Mr. Davis will give us a brief description of the proposed action as proposed by Estech.

Joe, would you come up to the podium, please, sir?

MR. DAVIS: Distinguished panel members and ladies and gentlemen of the audience, my name is Joe Davis, Manager of Projects for Estech General Chemicals Corporation.

Until relatively recently, our company was named Swift Agricultural Chemicals Corporation. There has been a change in name only. For convenience, I'll refer to Estech throughout this discussion.

During the mid 1960's, Estech carried out a prospecting and land acquisition program in Manatee County, Florida.

This resulted in the purchase of 10,394 acres of property located in northwestern, or, northeastern Manatee County.

Estech proposes to carry out phosphate rock mining and processing operations on approximately 6,600 acres of this property.

We propose to use proven equipment, design and process technology generally used by current mining and processing operations.

Two large electric draglines would excavate the matrix, which is composed of phosphate ore, sand and clay, and the

matrix will then be mixed with water, and the resulting slurry will be pumped to the proposed processing plant.

Pebbles-size phosphate ore will be removed by a washing and screening process. The smaller, sand-like particles of phosphate ore, referred to as concentrate, will be removed by a flotation process that is described in more detail in the Draft Environmental Impact Statement and resource documents.

Estech also proposes the construction of two phosphate rock dryers to remove most of the moisture content of the phosphate product prior to shipping to our customers.

The proposed phosphate rock mine and processing facilities should generate a nominal production rate of 3 million tons per year for 21 years after start-up.

Estech currently owns and operates the Watson Mine and Silver City Mine, located in Polk County, Florida.

The proposed new phosphate rock mine that is the subject of tonight's public hearing will be a replacement for the old Polk County mines after they are mined out.

Water will flow through proposed mining and processing operations that I have described. A very large percentage of this water will be recycled and recirculated through the system as a result of the industry's continuing water conservation efforts.

In Florida, however, most of the rainfall during any particular year is concentrated into a few months. During this wet season, it may become necessary to release some of the water in the mining and processing system into waters of the United States.

Any discharge of water will have been treated through long-term settlement to remove the clay particles extracted from the matrix during the processing of the phosphate rock.

This settlement process has been recognized by the United States Environmental Protection Agency as the best available demonstrated control technology for the control of discharges from phosphate rock mining and processing facilities.

Because the proposed Estech project will involve periodic discharges of treated water into the waters of the United States, the Federal Clean Water Act requires that Estech obtain a National Pollutant Discharge Elimination System, or NPDES, permit.

In addition, EPA has determined that the proposed Estech mine and processing plant would be a new source discharge under the Clean Water Act.

The issuance of an NPDES permit to a new source is a type of federal action that triggers the environmental review requirements of the National Environmental

11

Policy Act of 1969 or NEPA.

After consultation with EPA, Estech decided to comply with the Environmental Impact Statement requirements of NEPA through the use of the third-party procedure.

Under this procedure, an independent, private consultant prepared the Draft Environmental Impact Statement for EPA.

The expense of the EIS preparation was paid by Estech, but the independent consultant served solely at the direction and under the control of EPA.

The purpose of this public hearing is to receive comments on the Draft Environmental Impact Statement and proposed issuance of an NPDES permit for Estech's proposed project.

As a vitally concerned and affected member of the public, Estech will be providing written comments on the Draft EIS and proposed NPDES permit before the end of the public comment period.

Thank you.

MR. HAGAN: Thank you, Joe.

At this time I'd like to call on Mr. Bill Hamilton, President of Conservation Consultants, Incorporated, from Palmetto, who was the third-party EIS consultant for this project.

12

Bill?

A VOICE FROM THE AUDIENCE: The other speaker was not being heard too well. Perhaps the microphone ---

MR. HAMILTON: I certainly had to lower it.

(Laughter)

MR. HAMILTON: As noted, Conservation Consultants, Incorporated, was selected as the prime contractor under the third-party procedure to assist EPA in the development of the Draft Environmental Impact Statement regarding the proposed Estech phosphate mine named the Duette Mine in Manatee County, Florida.

As sort of an abbreviated history of our work, the first part of the EIS development process was the formulation of a plan of study.

This involved some extensive coordination between my firm, CCI, Conservation Consultants, Incorporated, and EPA's EIS Branch and all EPA technical support services.

The draft phosphate area-wide EIS was used to provide a focus on the issues that would be incorporated into the EIS through the plan of study.

The intent of the plan was to provide for a full identification and discussion of significant environmental impacts and provide an evaluation of alternatives, which would avoid or minimize adverse impacts in the Applicant's proposal.

The plan of study for the Estech EIS was reviewed for adequacy by the US Army Corps of Engineers and the Florida Department of Environmental Regulation as part of the plan formulation.

The first step in the actual Draft Environmental Impact Statement preparation effort was assimilation of background data. As several major baseline investigations have been performed by consultants for Estech in preparation of their development of regional impact application, this information served as a major source of data. Another major source of data for the impact statement at hand was the phosphate area-wide EIS.

In addition to these rather large studies, several site-specific studies for the EIS were conducted in the areas of radiation, air quality, archaeology, dam failure, water quality, and aquatic biology.

All the DRI studies and the additional studies performed by the third-party consultant were reviewed for adequacy by the EPA. In many instances, the EPA technical personnel made field inspections as part of the adequacy review.

During the entire Draft Environmental Impact Statement development process, there was this constant EPA and CCI interface.

Preparation of all draft, baseline and assessment

reports was coordinated directly with the EIS Branch and the appropriate EPA technical staff members. At each stage, all documents were provided to EPA for their technical specialists to review for their concurrence and for changes and/or additions where necessary.

EPA had the sole responsibility for final approval of all the Draft Environmental Impact Statement elements.

To give you a little bit about the draft itself that was available up front, it consists of several major sections. The introduction and description of the proposed activity are provided in the impact statement.

Mr. Davis ably presented the description of the proposed activity. Section 2 is an alternatives evaluation. Section 4 is a description of the baseline, impact, and mitigating measures concerning the natural environment. Section 5 is a description of the baseline, impact and mitigating measures of the man-made environment, and Section 6 consists of a comparison of the proposed activity with the area-wide phosphate EIS recommendations. Section 7 of the Draft EIS are the proposed agency actions.

A summary also precedes the main body of the document.

What I'd like to do now is to step to Section 5 of the EIS and highlight the alternatives that were

evaluated as part of the Draft Environmental Impact Statement.

Fourteen areas were selected to be investigated for alternatives. These included plant site locations, production rates, resource recovery methods, mining methods, ore transportation methods, beneficiation processes, process water sources, waste disposal and reclamation methods, discharge points, rock drying or shipping wet rock, product transportation modes, energy sources, and the no-action alternative.

Within these areas specific alternatives were studied for a total consideration of over 50 options. Alternatives were evaluated on the basis of technical feasibility, environmental impact and economic impact.

The proposed activities by the Applicant were generally found to be the optimum alternatives. Some alternatives investigated were, however, found to be acceptable and, in some cases, better than those proposed by Estech.

The alternatives that fall in these categories included the resource recovery alternative where three options were evaluated.

The first option evaluated was the mining, total mining of all phosphate reserves found on the site, regardless of the land cover, whether it be wetland, forest

or whatever.

The second option was no mining wherever there were wetlands on the site, and the third option evaluated was the Swift proposal that Mr. Davis described, which included some mining of wetlands and some preservation of wetlands.

Based on the assessment of the evaluations done in the Draft EIS, the optimum alternative seems to be somewhere between the proposed plan of Estech and the exclusion of all fresh water swamps, primarily due to environmental implications.

For the mining method alternatives, the proposed dragline was found to be preferred due to proven technology, although dredge mining appeared to be acceptable.

Eight surface water discharge point alternatives were found acceptable. Two alternatives maximized water efficiency and minimized discharge.

The proposed discharge arrangement of Estech, however, offered a discharge flexibility resulting in additional operational effectiveness.

With regard to the wet phosphate rock versus drying, shipping wet phosphate rock was the best environmental choice if, and only if, the rock is not dried in less efficient and less-effectively controlled equipment at the destination. From a standpoint of phosphate rock customer

requirements, this option was necessarily excluded as a viable alternative as the intended customers of the product do not currently have drying facilities.

Drying the rock at the proposed site was an environmentally-acceptable action given the fact that the new facility can satisfy current air quality regulations and in some cases with considerable margin.

In the no-action alternative, most, if not all, adverse environmental impacts associated with the mining would not occur.

The considerable projected economic benefit associated with mining would also not be accrued.

As a summary of impacts, as presented in Sections 4 and 5 of the EIS, significant impacts are as follows: Overall, 85 percent of the native upland vegetation will be replaced with improved pasture. Mining will destroy at least 476 acres of fresh water swamps and 364 acres of fresh water marshes.

Reclamation is proposed to restore these acreages and actually contribute a net gain of 15 percent in wetland vegetation on site.

The direct impact of mining will be the destruction of 417 acres of ephimeral feeder streams and their floodplains.

18

Mining will create several lakes on the site, however, which are a significant beneficial expansion of the aquatic environment.

Proposed mining will disturb the existing soils on approximately 75 percent of the site and will result in three new types of surface soils. These are clay, sand/clay, and overburden.

The average annual ground-water withdrawals would be limited to 13 million gallons a day less recharge at 3 mgd for a net consumption of 10 mgd.

During the fourth year of mining, approximately 2.88 million gallons a day of surface water will be used in the process.

The primary effect of these withdrawals from the deep ground-water system is the lowering of potentiometric surface within the area of influence of the wells. This effect was found to be extremely small in comparison to the large natural seasonal fluctuations in the vicinity of the site.

The primary effect of mining on the shallow ground-water system is a short-term lowering of the water table in the vicinity of the mine cuts.

During active mining, stream flow into Lake Manatee will decrease by approximately 9 percent. After reclamation, the average flows of the East and

the North Forks of the Manatee River, which traverse the site, will be reduced approximately .7 million gallons a day and .6 million gallons a day, respectively.

Discharges from the plant water system may be necessary due to the temporal variations in rainfall that Mr. Davis indicated.

It is anticipated that approximately 1.9 million gallons a day will be discharged in the East Fork of the Manatee River during August and September of an average rainfall year.

Effluent will be discharged into the North Fork at a rate of 1.8 million gallons a day during August, September and October.

In an investigation of the plant discharge and ambient water quality standards, six parameters were evaluated because of their potential effect on the downstream water supply.

All parameters fell well within the ambient water quality standards after a period of reasonable mixing.

The proposed mining operation will contribute to both primary and secondary air quality effects. Primary effects will be contributed by the operation of the two phosphate dryers, the storage of materials,

materials handling and shipping, as well as fugitive dust from land clearing and reclamation activities.

The proposed sources will not violate air quality standards nor significantly degrade air quality. The SO_2 and particulate matter emissions will satisfy the New Source Performance Standards and the Best Available Control Technology requirements. The proposed fugitive dust control on dryer emissions would also limit off-site transport of airborne radioactivity to the point where the annual dose could not be measured within the statistical variation of natural background.

Regarding the potential future residential development of the site, the predicted indoor radon progeny levels indicate only the reclaimed settling area may produce levels requiring remedial action.

If the clay settling areas are excluded for structural reasons or a topsoil replacement occurs, no reclaimed lands are predicted to produce homes with radon progeny levels near the remedial action level.

The socioeconomic impact of the proposed mining will exhibit a generally-beneficial effect. Operation of the mine will directly require 324 workers, many of which are expected to be relocated employees of the

Applicant. The direct economic effects of the mine are favorable, producing approximate annual yields of $382,400 in sales tax, $1.92 million in severance tax, and $1.982 million in Ad Valorem tax.

Regional economy effects derived through standard multipliers indicate an annual indirect impact of $35.4 million and an annual induced impact of $118.4 million.

Estimated employment associated with the activity is similarly projected to be 235 through indirect impact and 1,425 through induced impact.

The mine will exert no directly discernable effects on existing community services and facilities.

Long-term land use patterns would not be adversely impacted by the mining activity.

This site is proposed for agricultural uses in the Manatee County Comprehensive Plan. The planned mine reclamation program is designed to return the site to land forms amenable to a variety of agricultural uses.

On the short-term, the proposed mine site is located between two approved phosphate mines and therefore should not disrupt near-future land use trends in the area.

As a sort of a summary and ending statement,

I have briefly described the results of some evaluations made during the Draft EIS process. The draft summary EIS document, of course, contains considerably more detail.

The summary draft document itself, in most instances, is in turn a condensation of the comprehensive evaluation contained in thirteen resource documents that supplement the Draft EIS.

I believe all that material is available for review through the EPA.

Thank you.

MR. HAGAN: Thank you, Bill.

It is not customary for one sitting on the panel to make a statement in regard to this hearing. However, because of a turnover in personnel during the course of the development of this EIS, it has fallen my lot to see this particular project through to this point, and because of that I would like to read a statement of EPA's conclusions up to this point as a result of this EIS process.

The Environmental Protection Agency has developed and published an area-wide EIS covering the Central Florida phosphate industry.

In that area-wide study, several recommendations were made to guide future phosphate mining. The Estech

proposal deviated from those recommendations in only two points.

One was the construction of a rock dryer, and the other is the mining of a segment of the East Fork of the Manatee River.

The area-wide EIS provided for exceptions to the no-new rock dryers recommendation based on a case-by-case determination if energy determinations indicated that it was more efficient to dry the rock than to transport the moisture and provided air quality could be protected.

The Estech EIS has determined that more energy is required to dry the rock than to transport the moisture even when you're transporting that moisture to Far Eastern markets some 10,000 miles away.

However, many of Estech's customers are not prepared to handle the wet rock. Indeed, the conversion of the entire industry generally to wet rock processing is not expected for many years.

It is customary in the industry now to process dry rock. Thus, the market conditions under which Estech works dictate that they market dry rock.

With respect to air pollution, the analysis done in connection with the EIS indicates that sulfur dioxide concentrations at the point of maximum impact

will be less than 1 microgram per cubic meter on an annual average and about 2.3 micrograms per cubic meter on a maximum 24-hour concentration.

These levels are far below the ambient air quality standards and also far below the allowable PSD increment.

For total suspended particulates, the annual average at the point of maximum effect would be 1.4 micrograms per cubic meter or about 8 percent of the allowable PSD increment.

The cumulative impacts of all suspended particulate sources in the area, including Estech, if they were all combined at their maximum impact as if it occurred simultaneously and at the same point, which is an extremely remote possibility, but if that ever could possibly occur, it would be less than 50 percent of the ambient air standards.

For the 24-hour average, the suspended particulate impact was projected to be 37 micrograms per cubic meter or about 35 percent of the allowable 24-hour increment.

So in summary, while the EIS points out that there will be some increase in the air pollution emissions, the EIS analysis indicates that the equipment proposed will meet the New Source Performance Standards and the

Best Available Control Technology requirements and that the ambient air standards will be met.

Based on this, it is proposed that EPA will issue a PSD permit application subject to a full and final review of that application by the Region IV, air quality staff.

Now, with respect to the wetlands, after an extensive study of the biological systems of the East Fork Manatee River, it has been concluded by EPA that the area proposed for mining is a Category 1 wetland within the meaning of the area-wide EIS.

In translating from the general recommendations of the area-wide to the specific conditions of this proposed mine, more specific criteria for the categorizing of wetlands were developed, and I will refer those of you who have copies to page 176, 177 and 178 of the Draft EIS where those criteria are specified.

Based on these criteria and the biological evaluation of the East Fork, the Environmental Protection Agency has recommended that the area not be permitted for mining.

Finally, EPA does propose to issue an NPDES permit pursuant to the provisions of the Clean Water Act. The permit will contain as conditions those recommendations of the area-wide EIS which pertain to mining,

except the recommendation concerning rock dryers as previously discussed.

Water retention facilities are to be designed to contain or treat the ten-year, 24-hour precipitation event. Any discharges are subject to limits on total suspended solids of 30 milligrams per liter as a daily average with a 60 milligram per liter daily maximum and limits on fluoride of 10 milligrams per liter as a daily average and also the same limit as a daily maximum.

MR. PERRY: Thank you.

I don't believe that there are any other federal or state officials here at the present, but if there are, they are welcome to make a statement at this time.

(No response)

At this time I would like to recognize Mr. Louis Driggers, who is a Manatee County Commissioner. He did not indicate that he would like to speak, but we welcome you here tonight, Mr. Driggers.

Are there any other elected representatives that would like to be recognized and speak at this time?

(No response)

All right. If not, I'd like to make just a few statements as to the conduct of the hearing. We have now completed the presentation of the governmental

agencies and of the proposed permittee, and we would like to proceed with what is the real purpose of the hearing here tonight, and that is to receive comments from the public.

It is an expressed goal of both the Clean Water Act and the National Environmental Policy Act to encourage and to provide for public participation and input into determinations made pursuant to those statutes.

The Draft Environmental Impact Statement and NPDES permit are therefore being discussed in an open public forum to encourage full public participation in the decision-making process and to develop greater responsiveness of the governmental action to the public interest, further to develop and to improve the public's understanding of the Duette Mine permit and the action that this agency has proposed to take with respect to this proposed facility.

This hearing is being conducted pursuant to federal regulations, and it should represent to you an opportunity to make your views known with regard to the project to the governmental agency responsible for permitting it.

Notice of the public hearing was published in local newspapers. In addition, copies of the public

28

notice were mailed to each of those individuals or organizations that are on the EPA mailing list, as well as to other governmental agencies.

Before I proceed further, I would like to ask everyone who has not already done so to register. I believe there were some cards left out at the front table.

On the bottom of those cards, there is a place where you can indicate whether or not you would like to speak. If you would like to fill one of those cards out, those of you who haven't, and if you would like to speak, I would ask you to bring them up and just put them on the edge of the stage there, and we'll pick them up.

The hearing will be conducted very informally. The formal rules of evidence, as would be applied in a court, are not applicable here. Both oral and written comments will be accepted.

Any and all persons present desiring to make an oral statement or to submit written comments will be afforded the opportunity to do so.

If you have a written statement that accompanies your presentation, I would ask that we be given a copy of that statement prior to your beginning to make it.

If you have a lengthy written statement, I would

29

ask that your oral statement be a summary of that, if at all possible.

The oral presentations, I would like to have them limited, if possible, to between five and seven minutes, and I may interrupt and cut the presentations a bit short if necessary if you proceed too much over those limitations.

This is done to accommodate all those people who would like to speak and to give them an opportunity to say what they think.

Members of this panel may ask questions of any person presenting an oral comment wherein it's found necessary to clarify the nature or the substance of that comment.

However, I would like to emphasize that the audience will not be permitted to ask questions of those persons commenting for the record.

As we proceed with the agenda, I would like to ask each person making a statement to step to the microphone, which is over here, and state his or her name and the interest or organization that you represent.

This is a hearing being recorded by a court reporter, the young lady sitting down front here, for future transcription for the record; in addition to

30

that, all oral or written statements submitted here tonight.

The comment period for the Draft Environmental Impact Statement will remain open for approximately two weeks. That will allow for the submission of other comments.

We will hold the written record open in the Atlanta office of EPA. I believe that record will be held open until December 14th, 1979.

At this time I would like to recognize Dr. Jeffry Lincer, who is an Environmental Specialist with Sarasota County.

MR. SABA: Well, Mr. Perry, I rise, not to be recognized as an elected official, but to make the statement that not knowing exactly what the procedure was that you were following and hearing the comment that all governmental entities had been heard from, to let you know that Sarasota County is here to present comments that don't necessarily agree with the comments that have been made so far, and I'm John Saba from Sarasota County, and Dr. Lincer will be making a presentation and also Attorney Nelson.

DR. LINCER: With your permission, I'd like Attorney Nelson to make some preliminary remarks before I get into the technical side of the issue.

MR. PERRY: Well, be that the case, if there are representatives of the county here that would like to speak, you may do so at this time. I'm sorry that you were not recognized, but I notice that, Mr. Nelson, you were the last person to register, and I'm sorry I did not have your card; sorry, sir, I didn't catch your name; no slight intended.

MR. NELSON: My name's Richard Nelson, appearing here tonight on behalf of Sarasota County. I'll make a few brief opening comments. Dr. Lincer will make the primary presentation on behalf of Sarasota County.

Needless to say, Sarasota County has and continues to be strongly opposed to this mining project. Let me say that there's no question in anybody's mind, in EPA's or the Conservation Consultants, Inc.'s or anybody who has done an analysis of phosphate mining, that this project, like any other phosphate mining project, will substantially increase air and water pollution, and of course that is one of the reasons why we're all here tonight, and it's not a question of whether or not it will increase air and water pollution. It's a question of whether or not that increase in pollution is such as should be permitted under local environmental regulations, state environmental regulations and EPA regulations.

32

As I understand, the purpose of this hearing is to examine and to react to the Environmental Impact Statement prepared by Conservation Consultants, Inc.

Permit me to say that I know there has been some question as to the total objectivity of that firm. My own personal reaction is that the last time I saw that firm, they were appearing as expert witnesses against Sarasota County in a phosphate mining project case.

They have traditionally represented the phosphate industry. They're oriented toward the phosphate industry, and we feel a little uncomfortable with regard to their selection as the contractors to perform an Environmental Impact Statement, which supposedly was to be totally impartial from the public's standpoint. Nevertheless, we want to give them the benefit of the doubt.

However, in this particular instance we find significant fault with the statement, which they have prepared. We do not feel that the statement complies with the fundamental requirements of federal law.

It does not examine, with any degree of thoroughness at all, the alternatives. I heard Mr. Hamilton speak about the many alternatives that they examined. However, when you really read carefully the EIS, which

T-1

33

they have prepared, you'll find that it's more of an attempt to justify deviations from the area-wide EIS.

As you know, the federal government spent a million or so dollars on an area-wide EIS to determine what ought to be done with regard to the tremendous havoc that the phosphate industry caused to the environment in the State of Florida.

It was determined that some of the things that shouldn't be done were: the creation of slime ponds above grade. Now, does this project have slime ponds above grade? Yes, it does. And the EIS, prepared by Conservation Consultants, attempts to justify that. T-2

One of the other requirements or suggestions that the federal government obtained in the area-wide EIS with regard to preventing damage from phosphate mining was not to use rock dryers. Does this project have a rock dryer? Indeed it does, and a considerable amount of time is devoted in this EIS to justifying the use of that rock dryer. T-3

We know, as does Swift know, that they have a rock dryer presently in operation that could be utilized in an adjacent area for the drying of this rock if it is in fact necessary to use a rock dryer rather than ship it wet. That alternative has not been examined with any degree of thoroughness whatsoever. T-4

34

Therefore, it doesn't comply with the requirements of the federal law.

Lastly, as you have pointed out, Mr. Hagan, the EIS or the project proposes to extensively mine wetlands. Now, I understand that your recommendation is going to be that they eliminate one of the areas of wetlands, but they're still in a very critical wetland area. They are in the Manatee River Basin, which is one of the sources, the primary source, of water to Lake Manatee, which is a source of water, important source of water, to Manatee County and Sarasota County, and we all know that phosphate mines discharge pollutants, and we all know that pollutants flow downstream, and when it flows downstream where is it going to go? Into Lake Manatee.

So we are very much opposed and concerned about this project, and we urge you to at least withhold making a decision on the matter, and it doesn't sound as though that's going to be possible from the comments I've heard already this evening, but we would urge you as a matter of policy and a matter of practicality to withhold making a decision on this matter at least until the local land use decision question has been resolved.

Until the local land use decision has been resolved, you really don't know what this project's going to look like, because the local and state governments may attach

T-5

35

conditions and stipulations which conceivably could correct many of the very flagrant violations of air and water pollution standards in this area.

Now, one other point that I'd like to make, and that's one on radiation, and I'm no expert in radiation, and I know that Mr. Hamilton's no expert in radiation, and I also know that there were only six borings made in this entire 10,000 acres to determine the amount of radiation material, and that is totally inadequate.

We all know that phosphate mining has associated with it significant increases in radiation. It uncovers and brings to the surface radiation, radioactive material that's covered, so we know that this project will many hundreds of times increase the amount of existing radiation that there is at the surface.

Now, what you're saying is, "Well, it may still be within limits," but that's not the point we're concerned with. We have a relatively clean environment in this area, and we'd like to keep it that way. We don't care whether or not the rest of the country has pollution. They're not as dependent upon retirement and recreation as we are, so what we're saying is we know that there's going to be a significant increase,

T-6

36

for example, in radiation at the surface due to the uncovering of the radioactive material.

We ought to make an effort, a conscientious, thorough effort, to determine by how much, and six borings in 10,000 acres is not going to get it.

Those are the preliminary comments that I have to make. Dr. Lincer will speak to you on a little more academic level than I have.

Thank you very much.

(Applause)

DR. LINCER: My name is Jeffry L. Lincer. I am the County Environmental Specialist for Sarasota County. This (presenting) is a copy of a report that I will try to summarize as briefly as possible.

Thank you very much for this opportunity to present Sarasota County's concerns relating to Estech's proposed Duette Mine.

Without further ado, I will get right into what we consider the inadequacies of this Draft Environmental Impact Statement. A more detailed discussion of these various points, and some additional ones, can be found in a report that Mr. Klier, Director of Pollution Control for Sarasota County, and I co-authored entitled, "Estech's, formerly Swift, Draft Environmental Impact Statement, Proposed Duette Mine, Phosphate Mine Beneficiation Plant,

37

and Rock Dryer," dated November 27, 1979.

I'd like to first address the air pollution problem. If there are any questions relating to that particular section, I will redirect them to Mr. Klier, because of his extensive background in this area.

With respect to the manner in which the air quality analysis was carried out, there are several problems. First of all, the analysis is based on the presumption that fuel oil to be fired in the facility would contain a maximum of 1 percent sulfur by weight.

T-7

Due to recent international developments, this 1 percent sulfur fuel oil is not available on a reliable basis, and a relaxation of the 1 percent standard has resulted in FP&L, Florida Power and Light, being allowed to burn 2.5 percent sulfur fuel, for instance.

Clearly, the air quality analysis should be reevaluated based on a more realistic fuel oil of at least 2.5 percent sulfur fuel.

Secondly, to assume that 96.5 percent of the sulfur dioxide will be removed by wet scrubbers is overly optimistic. It was poorly documented in the report, and it's far in excess of what is considered state of the art.

T-8

According to a recent EPA review of sulfur

38

dioxide removal by scrubbers in this country, which Mr. Klier participated in, a 90 percent removal was the maximum that could be achieved on a reliable basis.

Thirdly, and as indicated by the resource document on air quality, the Draft EIS assumed that the sulfur dioxide emission rate would not be very great and therefore a detailed modeling analysis would not be warranted.

Because of the above two points, a more detailed major source analysis of sulfur dioxide should be performed. Along these lines, the approach that was used, that of factoring the nitrogen oxide concentrations by the ratio of sulfur dioxide to nitrogen oxide emission rates, is an unjustified short cut, considering the fact that the sulfur dioxide analysis should be done independently as a major source. T-9

In addition, critical information, like the timing when the Florida Power and Light Manatee plant was subject to a 1 percent sulfur fuel regulation and the resultant increase in SO_2, which the plant would emit with subsequent higher sulfur fuel, were omitted in the air quality analysis. T-10

The air quality documents were presented in a manner that made review of the actual input computer data very difficult. For example, the interactive T-11

39

sources that were actually inputted to the computer were not cross-referenced. The various computer runs were not indexed or properly identified, and the input codes used were inadequately explained.

As if EPA's area-wide EIS had never been written, Estech has proposed a new rock dryer. The area-wide EIS, one, was predicated on the fact that there would be no additional rock dryers; and two, clearly recommended the elimination of the rock drying process at the beneficiation plant.

With the above points in mind, the alternative of using an existing rock dryer at a remote location becomes far more logical. The apparent problems of using "older, less-effectively controlled equipment located in areas marginal with respect to air quality standards" is, in fact, an opportunity for a double benefit.

By choosing this alternative, the industry has the opportunity to retrofit these existing facilities with adequate environmental protection equipment. This would result in no or little increase in air pollution in Manatee County and likely, in fact, to reduce the existing pollution being emitted by the rock dryers in Polk County.

I'd like next to address three topics, and since

T-12

they are interrelated, I would like to discuss them as a unit. These are soils, hydrology, and water quality.

There are important, but often ignored, interrelationships between soils, the water contained therein and the quantity and quality of receiving stream water.

Mining will disturb soils on 7,600 acres approximately and totally alter the nature of those soils on approximately 6,600 of those acres.

Existing soil profiles in mining areas will be destroyed, and in general the surface horizons will be buried under layers of either subsurface overburden or waste materials. As indicated in the Draft EIS, the use of mined-out pits for storage areas for clay wastes and tailing sands will have an effect on the water quality in the shallow system, but the nature of these changes will depend upon the nature of the materials placed in these pits.

According to that text, the lack of reliable data on the water quality of waste clay prevents projection of this impact. It can't be categorized. T-13

During the rainy season, close to 4 million gallons per day will be discharged from the operation to the East and North Forks of the Manatee River. There will be radical changes in water quality.

When, as indicated in the Draft EIS, there will be at least

a doubling of radium-226 concentration in surface waters; when, as indicated on Tables 4.10C and D of the Draft EIS, there will be up to a tenfold increase in phosphorus concentration and mass loadings in the North and East Forks of the Manatee River; when there will be as much as an eighteenfold increase in fluoride; when there will be a doubling of biological oxygen demand; when there will be up to a fivefold increase in suspended solids; and when there will be an increased contribution to these rivers of over 14,000 pounds of total dissolved solids per day, even during minimal flow conditions, can we in all good conscience conclude that the impact on water quality will be acceptable?

In view of the above perturbations, it is easy to understand Manatee County's reluctance to allow this kind of land use, especially upstream from what is perhaps their most valuable asset.

The sections of this Draft EIS relating to soils, hydrology and water quality should be reassessed using an holistic approach in an earnest attempt to clearly identify impacts that are unavoidable and/or without mitigation so that intelligent policy decisions can be made with respect to the desirability of trade-off

42

options.

As the text now stands, important data are subordinated under apparently unrelated sections with little effort to indicate cause and effect relationships in a straightforward manner.

Now, what about the slime pond? The Draft EIS proposes a 480-acre conventional above-ground slime pond, which will remain active throughout the entire life of the mine to receive clay waste.

By the end of the mine life, the area will be filled to about 25 feet above grade. This proposal is diametrically opposed to the recommendations and the intent of the area-wide EIS, which states, "eliminate conventional above-ground slime disposal areas." T-14

It is also contrary to the best interests of Manatee County. As indicated by Mr. Randall, Pollution Control Director for Manatee County, on February 15, 1979, at a public hearing on this proposed mine, "The best way to protect Manatee's most valuable asset, that is, its water, is to have a below-grade settling pond."

We were glad to see the Applicant choose to devote an entire section to the hypothetical failure of the clay settling area embankment. Apparently, the 43

Applicant is almost as concerned about this subject as those whose potable water source would be affected by such a catastrophe.

As indicated in the Draft EIS, should the dam fail, suspended solids over a two-month period would deposit in the reservoir approximately a 60-acre feet of the suspended solids, and total radium-226 would exceed the State's standard for Class 1-A waters upon entering Manatee's reservoir.

The effect of the solids on the Manatee River floodplain would be to kill most trees and severely stress many of those that do survive.

It would also result in the destruction of aquatic fauna of the river with few, if any, organisms surviving.

Although it is apparently financially unattractive to the industry to comply with the area-wide EIS recommendation relating to slime ponds, no alternatives to the conventional above-ground slime pond are even discussed.

A conscientious attempt should be made to investigate and honestly discuss partially or totally incised slime ponds, thereby significantly decreasing chances of an environmental disaster.

T-16

Based upon recent major dam failures, including

44

that of FP&L's facility in the Okeechobee area just a few weeks ago -- and this was a dam that was constructed within approximately the last year and a half -- putting our faith in a once-a-year inspection by a Registered Professional Engineer and his monthly review of reports by on-site personnel is woefully inadequate considering the above projected impacts.

The approach should not be how we manage a slime pond once it's installed. An above-ground slime pond should not be allowed in the first place.

I'd like now to talk about water management, and I guess that's a matter of relativity. As indicated by the Draft EIS, 89 percent of the total water requirements will be recycled water.

However, the apparently innocuous 11 percent make-up water required to offset system losses will average more than 16-plus million gallons a day, more than most large cities around here.

In a rapidly growing area where potable water needs are escalating, any reduction of potable water availability has to be examined very carefully. A reduction of 7.2 million gallons a day mgd in the flow of the North and East Forks of the Manatee River will actually decrease the discharge of that potable water into Manatee's reservoir by almost 10 percent.

45

As bad as this is, what seems to have been lost in the statistical manipulations presented in the Draft EIS is that the total flow of potable water, specifically from the North and East Forks of the Manatee, would be reduced by 33 percent.

With this 10 percent decrease in potable water reaching the Manatee reservoir, with a 33 percent reduction of potable water supply to major contributors of that reservoir, and the resulting ecological impact of discharge reduction, as described in a couple of minutes, the entire water management program needs to be revisited. T-16

I'm glad to see that that segment of the East Fork of the Manatee River proposed for mining has been de-determined to be a Category 1 wetland.

However, disturbing wetland Categories 1 and 2 -- excuse me -- 2 and 3 should be re-examined when they are upstream of Category 1 wetlands and when that perturbation can be expected to affect downstream Category 1 wetlands. T-17

A very important consideration, which was referred to previously, is the ecological impact of water flow reduction on separate parts of the drainage system, which is somehow glossed over by grouping statistics. T-18

For example, the Draft EIS indicates inflow will occur -- a reduction in flow will occur in the East Fork

46

by 5.4 mgd. A comparison with existing statistics in the same document reveals that this 5.4 mgd exceeds the average minimum flow during wet months as well as the average mean and minimum flow for dry months, 5, 3 and .8 mgd respectively.

With a vision of dried-up stream beds and a complete annihilation of fish, aquatic, invertebrates, and other wildlife, which are totally dependent upon stream water for their existence, Estech's proposed water management program is unacceptable.

What about other habitat loss? With respect to upland communities being lost, 85 percent of native upland vegetation will be lost as a result of the proposed activity.

As indicated by the Draft EIS, these impacts are largely long-term and irreversible. Perhaps the most devastating aspect of the proposed mining reclamation plan on upland communities is their replacement by monocultures, like improved pasture.

For instance, there will be an increase in improved pasture of almost 5,000 acres, an increase of fourfold over that existing at the present time. Preserving 50 acres of sand pine scrub and an 18-acre cypress pond, while mining all around it and leaving it as a pedestal, and devastating a major portion of the

47

floodplain swamps, is not a reassuring commitment to protecting important habitats.

Keeping in mind the policy objectives of Manatee County and the Regional Planning Council, which refer to desirable objectives, such as maintaining a high quality of human life and protecting environmental and natural resources, the anticipated overall loss of 85 percent of native upland vegetation is an unacceptable outgrowth of the proposed mine and related activities.

Of course, we shouldn't only concern ourselves with the habitats. We should be concerned with how that destruction affects the denizens, the inhabitants of that habitat, and I'd like to address now very briefly the rare and endangered species question.

All levels of government, local, state and federal, have recognized the importance of the medical, scientific and aesthetic values of the endangered species and the need to protect the ecosystems upon which endangered species depend.

Sixteen species considered endangered, threatened, rare or of special concern have been observed on or immediately adjacent to the Estech property. At least two species will have their preferred nesting habitat "substantially decreased by mining" and a third "may be able to survive in one of the disturbed scrubs, but there

will be little suitable habitat after mining."

As indicated by a recent study by Layne, et al., of the Archbold Biological Station, other endangered or threatened species, like the Florida panther, the Florida bear, the Bald Eagle, and the osprey are likely to be present on that site.

However, and as admitted by the Draft EIS, the field techniques relating to these species may not have been extensive enough to reveal the presence of these important species. T-19

Like most other Draft EIS's reviewed to date, this one simply lists the threatened or endangered species that will be affected, if not annihilated, and makes no serious effort to actually preserve these unique gene pools. T-20

The time is long overdue for the phosphate industry to justifiably shoulder the responsibility of accurately identifying the unique and endangered species present on the proposed site and then in appropriate detail indicate how these resources will be protected.

Very briefly, concerning the reclamation, there are foreseeable problems associated with that reclamation. For instance, it is very possible that the proposed method will reduce the effectiveness of recharged wells

by decreasing the permeability of the property and decreasing the bearing capacity of the new soil, an assemblage which will limit future land use options for that site.

If the land use is to remain rural in nature, the limitations may not be too serious. However, when residential development ultimately finds its way to that site, or perhaps other kinds of development, developers may find it necessary to take extraordinary precautions in order to stabilize foundations or take other measures that will increase the cost of development.

T-21

Since the health implications of increased radiation are of immense concern to most of us, we should be quite sure that we are characterizing the existing radiological picture accurately. Along these lines, one has to question whether six samples for radioactive substance taken on site is adequate.

T-22

Given the fact that much expert testimony indicates a very possible health impact from any increase in radiation exposure, we are more than justified in taking a conservative approach to handling these substances.

As a bare minimum indication of concern for public health, the Applicant should be required to remove and

50

store the surface horizons of the soil in such a way that material can be replaced on top of the more radioactive substances below.

By way of conclusions, the Draft EIS describes a number of installations and land uses that are in direct conflict with EPA's area-wide EIS. The most outstanding, of course, are the rock dryer, the above-ground slime pond and devastation of Class 1 and juxtaposed wetlands.

Not only is the proposed action by Estech contrary to the recommendations of that area-wide EIS and to Manatee County's zoning ordinances, but it's also diametrically opposed to the region's growth policies as stated in the Regional Planning Council's Future of the Region, which was adopted in July of '75 and amended recently, April of 1979.

What is particularly disconcerting about this Draft EIS is the overall orientation. That orientation is to justify exceptions to the recommendations of the area-wide EIS instead of identifying, describing and analyzing mining methods which would comply with the recommendations of that area-wide EIS, especially those relating to rock dryers, above-ground slime ponds, and the protection of wetlands.

There is a consistent glossing over of negative

51

impacts and a reluctance to spotlight problems and tackle alternatives in a conscientious manner.

EPA in good faith cannot accept this Draft EIS as an adequate extension of the area-wide EIS. Unless EPA requires the third-party consultant to revisit the above key issues that deviate significantly from the recommendations of the EIS, EPA will in fact be abandoning the area-wide EIS, which cost the taxpayers in excess of $1 million.

EPA cannot take the action proposed on page 180 of the Draft EIS because that action is based upon a site-specific EIS which does not conscientiously attempt to identify, describe and analyze mining methods which would eliminate above-ground slime ponds, not require the proposed rock dryer, and protect wetlands and endangered species which are vital and outstanding local and natural resources.

Recommendations are but two --

MR. PERRY: Briefly, please.

DR. LINCER: -- one, that no further agency action be taken until the Draft EIS is re-focused so that EPA can make an intelligent decision, as required by NEPA, based upon a conscientious analysis of environmental impacts identified by this report that have been glossed over by the Draft EIS; and the second recommendation is

52

that no federal permit be issued because it cannot be justified in the absence of local approval of the proposed Estech mining.

Thank you.

(Applause)

MR. HAGAN: I'd like to thank Jeff for his excellent report. As always, he responds in an overwhelming technically-competent way, and we will make, not only his oral presentation, but his written report a part of the record of this meeting, and we will respond to the point-by-point discussions that he had in our final Environmental Impact Statement.

MR. PERRY: Any other comments from the panel?

MR. BRYANT: Yes. I would like to have him submit a copy of this study to me.

MR. HAGAN: Jeff, since we printed 600 copies of the EIS, is it reasonable to expect that you could give us a couple of extra copies of this?

DR. LINCER: I think I brought 1 percent of those 600 with me.

MR. HAGAN: I appreciate it. Thank you.

MR. PERRY: Are there any other comments?

(No response)

If not, I would like at this time to see whether or not there are any other local governmental interests

that would like to be recognized and/or speak at this time.

MS. GLASS: Patricia Glass from Manatee County.

MR. HAGAN: Yes, ma'am. Thank you for being here.

MR. PERRY: Are there any others?

(No response)

All right. I would like to proceed, then, with the public's participation and recognize Mr. Robert A. Lyman.

Mr. Lyman?

MR. LYMAN: I'm Robert A. Lyman, agricultural consultant. I have a letter to you, Mr. Hagan, which I wish to file and which I wish to read also. (Presenting)

As I look at this crowd, I wonder how many have been to Duette.

A VOICE FROM THE AUDIENCE: I have.

(A showing of hands)

About one in ten, almost as many here as might be at the school house recreation Halloween night.

Duette is a growing community in agriculture. I've watched it for thirty years grow in improved pastures, in improved citrus groves, and I have participated in it, and I still am, but I don't live there.

It's far away to go to Polk County, and they live

in Lakeland, and they have their pastures and the groves 20, 30 miles away from Lakeland. This is not unusual throughout the world.

It is a beautiful community. It is as far out as you can get in Manatee County, green, unspoiled.

I would like to say that EPA, Mr. Hagan, CCI consultants, Mr. Hamilton, and Mr. Davis from Estech have a large responsibility here. I recognize that.

However, I would like to speak to you tonight about another large responsibility, which in some ways has been slighted. This is the agricultural responsibility.

Most of the Manatee County area, 400,000 acres, is still agricultural. One-fourth of this, over 100,000 acres, is in the hands of the phosphate people. These are the agricultural reserves we are now needing and which will be in great demand for the next ten years and for which there'll be an agricultural shortage in the next 20 years for cultivation, citrus, improved pasture, cattle, dirt.

However, don't take me wrong. I'm not attacking the phosphate industry. I'm just speaking neutrally of what is best for the long-range agricultural use of this land, and I am here tonight because I would feel that if I were not here, I would be guilty of default.

55

Therefore, I hope you follow my letter in good grace.

Mr. John E. Hagan, III, Chief, EIS Branch, Environmental Protection Agency, Region IV, 345 Courtland Street, N.E., Atlanta, Georgia 30308, regards Environmental Impact Statement, Estech General Chemical Corporation, Duette Mine, Manatee County, Florida, Draft, EPA 904/9-79-044, October 1979:

Dear Mr. Hagan: The above document has been received from Mr. John C. White, Regional Administrator, to me as a concerned individual.

This document and the resource documents have been reviewed with interest. The following comment is respectfully submitted.

These voluminous documents have the potential of being good references for economic and academic uses. However, there is need for corrections, revision and more clarification in the agricultural presentations. T-23

This is important as the highest and best use is agricultural and will continue after mining. It is currently a high potential for the future needs of more intensive uses and yields.

You can and should correct and improve your documents by becoming involved with personalized, direct exchanges with local agencies for basic and common T-24

information, as well as potential planning.

This includes land and water, USDA Soil Conservation Service; forestry, Forest Service, State of Florida; economics, Economic Research Department, IFAS, University of Florida; roads, Manatee County.

Manatee County also has many other departments including a large staff in the County Extension Service.

This is ad libbed; it's not in the letter, and I assume it's being recorded. I hope so.

This includes pages 120, 122, 123, 128, 138, 139 157, etcetera. The subjects presented are too diverse and voluminous for any one individual or agency to adequately review or present.

Thank you for this opportunity to show my concern. Very truly yours, Robert A. Lyman. Carbon copies to Louis E. Driggers, Manatee County Commissioners; I.H. Stewart, District Conservationist, USDA SCS; J. Walter Prevatt, Extension Area Economist, University of Florida; George Montgomery, III, County Forester, Florida Department of Agriculture; Dr. C.W. Hendry, Chief, Bureau of Geology, Florida State DNR.

Thank you for the opportunity. When you ---

(Applause)

MR. PERRY: Thank you, Mr. Lyman.

I would like at this time to recognize Mr. Fred C. Duisberg representing Save Our Bays Association.

MR. DUISBERG: My name is Fred Duisberg. I'm President of Save Our Bays Association. My reason for being here is to represent the feeling, the opinions of the ordinary citizens of this area.

Recently, this last spring, Save Our Bays Association, through A.C. Nielsen Corporation, conducted a survey of opinion in connection with the upcoming land use plans as mandated by the State.

Included in that survey were two questions concerning phosphate; that is, the -- well, the reaction of the people answering the survey --- The survey itself was sent out --- It concerned Sarasota County.

It was sent out to one out of every five registered voters of that county, a total of in excess of 20,000 people.

The response was in excess of 6,000 people, and the two questions concerning phosphate mining, and these were kept as simple as possible --- At any rate, on that basis, A.C. Nielsen Corporation, considered the, well, most credible corporation in the world in this field, felt that it was an extremely credible survey. The response was far in excess, almost double, of what they expected.

So it indicated a high degree of concern as far

as the citizenry of this area's concerned.

The two questions concerning phosphate: One, do you consider mining and processing of phosphate as having an impact on an environment?

Most of the answers were "very detrimental," and 63 percent of the persons answering said yes, phosphate mining was very detrimental. This is based on the information that has been available through the Draft EIS, through newspaper reporting, and a great deal of information that has been disseminated throughout this entire area.

Those that said it was somewhat detrimental were 23 percent. In other words, 86 percent of the people, a true cross-section of the population of this area, consider the phosphate mining and processing to be detrimental to their best interest.

The permitting of mining and processing of phosphate should be withheld until safeguards to protect the environment are assured.

Now, I think the safeguards have been spelled out and they have been mentioned in this forum very much by the Texas Instruments, EPA, Draft Environmental -- regional environmental study, which is available right here in this school, incidentally.

At any rate, those people, then, answering this

questionnaire who are violently opposed, and this is the term used, to further phosphate mining without adequate safeguards to protect the environment, 82 percent are violently opposed. Thirteen percent are moderately opposed. Only 5 percent are either not concerned or have no answer.

Now, I think this is now 95 percent of a true cross-section of the population, of a large portion of the population, that must be affected by this mining.

I think it's the obligation of every government agency and of everyone employed by a government agency to listen to the people. That's their job.

Now, this thing goes beyond the technical information that has been given here. I'm speaking simply as a layman, but we're concerned with an irreplaceable natural resource, a resource that is far more important to our future than petroleum, and everybody knows the situation this country is in today.

We're being blackmailed because we are dependent upon foreign sources. Florida has 4 percent of the phosphate of the world. Our phosphate will be exhausted, completely exhausted, according to the EPA, Texas Instruments, studies, by the turn of the century, and we will then be, to a large extent, at the mercy of Middle Eastern suppliers.

T-28

60

The major portion of phosphate is contained in Morocco, some 40 percent, as compared to our 4 percent. We are shipping out more than 40 percent of what we're mining now, and our mining is increasing year after year.

The major objections, that is, as far as environmental considerations are concerned and technical points, have and will be made by other people, but I would say this, that the important thing to consider here is the real welfare, the real future of our own country, our United States.

If we fail to do that, then we are actually engaged in a criminal action. That's everyone, you people sitting at the front and you in the audience and all of us, because we are jeopardizing --

(Applause)

-- our entire future. Thank you very much.

(Applause)

MR. PERRY: Thank you, Mr. Duisberg.

I'd now like to recognize Mary L. Jelkes, who is a physician. Please pardon me if I mispronounce anyone's name. It's not my intention.

DR. JELKES: Thank you, Mr. Perry.

I'm a pediatric allergist, and I've been concerned with the environmental effects of the phosphate industry

on the health of our population for some time. I have addressed some of the general attitudes that other people have addressed here, so I wanted to hit just some of the areas that have not been covered, and I will give you my copy of what I am presenting.

Actually, one area that has not been adequately addressed here is the radiation problem -- and I did review the EIS statement in draft -- in that they addressed the gamma radiation more so than alpha radiation.

The alpha is the soluble factor which is of more importance to health, and this gets in the air and in the water and is of more consequence to human health.

In the State of Florida, they have found an increased rate of lung cancer and, of course, here's where a lot of phosphate mining is occurring.

I think we all know very little. There's a very short supply of knowledge in the area of health effects of radiation. We do know even low levels may have serious effects.

Until we have further studies and knowledge in this area, I think we should require more care in the phosphate industry activity. There are probably methods of controlling the dispersal of this radiation. I think

T-26

62

I have read that there are ways of neutralizing the acidity, which decreases some of the dispersal.

More things of this sort should be addressed. I have gone into other areas in my letter here, but I would like to summarize, that you should implement the newer guidelines that have been addressed here that have been developed by the EPA and require recovery of any of the uranium and fluoride from the waste.

You should line the waste ponds with an impervious material and eliminate the rock drying that is implied by this statement, require strict compliance with the water consumptive uses and require strict reclamation rules.

The areas that are reclaimed should be posted as hazardous until they are safe to the population. Avoid conventional slime ponds and do not allow the mining of the East Fork of the Manatee River, as the draft statement had implied would be allowed.

I submit my copy here, which covers other articles, too. (Presenting)

MR. PERRY: Thank you, Doctor.

(Applause)

I would now like to recognize Mrs. C.G. Fernald, who is Vice-Chairman of Save Our Bays, Incorporated.

MRS. FERNALD: My name is C.G. Fernald, and I represent Save Our Bays for Manatee County, but I'm speaking to you tonight mostly as an avowed capitalist, and I am absolutely appalled that capitalism, in the guise of all the phosphate companies, would be wrecking the economy of this area, wrecking the land, while doing absolutely nothing for the people in the area.

We are people who live here, thousands of us. We make our homes here, and we see capitalist companies completely forgetting about the benefits of the United States.

Phosphate, lasting only 20 years; all these companies have to do is block it up for 20 years and wait until other people's phosphate is gone before they use ours, but Russian ships ship phosphate overseas. Germans can buy phosphate cheaper than they can mine it themselves in their own country, and we're letting capitalist companies do this to us and cut us to pieces, and here we have a county that bases all its economy on retirees and vacationers, and I'd like to have you people in EPA really look into the money that comes into this county in Social Security, the money that comes into it in vacationers and see how it balances out when the land is ruined and the people take their money away.

Retirees are mobile. They can decide to move

T-27

64

somewhere else if they don't like the area, and this is exactly what's going to happen in this country and in this area, unless the companies are a little more responsible.

So I'm pleading for the capitalist companies to really pay attention to what's good for the country for a change and do something about it.

I have some questions to ask. Are you making any attempt to look at the way the reclamation has been done in Polk County from the other mines this company has had? Are foreign investors investing in this company? Are we being involved with foreign investors who want to take the phosphate out of the country? Have you looked into the ships that's shipping out phosphate to other places in the world?

I think that the EPA and the Department of Environmental Regulation have a lot more to look at than just the physical aspects of this, and I plead with you to do this.

Thank you very much.

(Applause)

MR. PERRY: Thank you, ma'am.

I would now like to recognize Mr. James L. Hunter, who I believe represents the Manatee/Sarasota group of the Sierra Club.

T-28

T-29

MR. HUNTER: Members of the panel, thank you very much.

First of all, in no way do I want to criticize only Mr. Davis's Estech mining operation as proposed in Manatee County.

The Sierra Club is totally opposed to any more phosphate mining in Manatee County because it will spread to Sarasota County.

What we're talking about is, as Mr. Davis pointed out, when Polk County mines run out of phosphate, they are moving to Manatee County. When those mines in Manatee County run out of phosphate, they will be moving elsewhere.

I want to address all the facets of the Environmental Impact Statement, but our primary emphasis, as I said, is going to be on the total effect of phosphate mining in this area.

We are opposed to the diversion of the East Fork of the Manatee River. We foresee slime spills, just as we've seen on the Peace River, occurring on the Manatee River.

Also we foresee very grave, great problems with the reclamation as stated. First of all, we see that out of the 10,000 acres that Estech owns, we're going to be mining about 6,600 acres. Out of that, about 68 acres

66

are going to be preserved, about 18 acres of cypress, and 50 acres of pine.

This seems like a small point of gratitude. What are we going to see after the mining is done? First of all, I question the 100 acres that are going to be returned to "wilderness." How is this going to happen when we know that not native species overtake the lands in Florida, but Melaleuca, Australian pines, and Brazilian peppers.

We can see it now everywhere we disturb the lands in our preserved areas from the Everglades to our own Myakka State Park.

Lastly, I think what we're seeing here, as Mr. Duisberg pointed out, that there is a nation-wide effort to see a new direction in our development and industrialization. The objective of this and the result of this is to end the waste of our resources, to end the waste of our water, air, land and non-renewable minerals, non-metallic and metallic, from phosphate to oil, and the result, final result, is that local governments throughout the United States and local citizens are seeing that the nation must pay attention to this, that we think that our local environments are worth preserving.

Thank you very much.

T-30

67

(Applause)

MR. PERRY: Thank you, Mr. Hunter.

I would now like to recognize Mr. John Rains, Jr., President of the Manatee Chapter of the Izaak Walton League.

MR. RAINS: Mr. Perry, I would like to waive my five minutes and let Mrs. Rains speak next, if I may, and this will be a joint presentation, only it will run a little bit longer than one person to get through, if this is agreeable with you.

MR. PERRY: That'll be fine. Mrs. Gloria C. Rains of the Manasota-88.

MRS. RAINS: I am Gloria C. Rains of 5314 Bay State Road, Palmetto, here as a member of the Izaak Walton League and as Chairman of Manasota-88.

Some of our members find this hearing at a time when the Estech application to mine phosphate in Manatee County has been denied by our local government and when the matter is under litigation, incongruous and an event that could be misconstrued by some as an attempt by the federal government to usurp the power of local government.

Certainly, if the county's decision to deny this firm's application is upheld, as we have every hope it will be, this hearing is unnecessary.

T-31

We would ask that you withhold a decision regarding the issuance of this permit until all litigation has ended.

We are opposed to the permitting of this Estech facility for the following reasons:

The quantity of uranium oxides mixed with phosphate rock exceeds the quantity extracted by the domestic uranium industry. These radioactive substances are redistributed and concentrated during mining. No small matter when you realize after mining that 48% of total radioactivity remains with the slime ponds and liquified clay and 12% remains in the waste sand tailings.

Therefore, I would like to bring to your attention some most serious comments regarding the separate EIS document entitled Radiological Environment, dated October 1979.

In this document you will find reference to an article in Science Magazine and a reference to Spalding. It appears these references are incorrect in text. Therefore, it appears the assumptions through this document may be incorrect. T-32

Due to unavoidable problems, information I hoped to present you from Dr. Edward A. Martell, National Center for Atmospheric Research, Boulder, Colorado will be mailed by Dr. Martell to both the Atlanta office and

69

to the National Administrator.

However, Dr. Martell has provided information regarding "possible groundwater contamination from uranium contamination in the reclaimed land areas and on the magnitude of risks due to radon progeny in structures located on reclaimed lands."

On the top of page 57, referenced volume: "It is assumed that ore processing does not change the uranium to radium equilibrium.

"This assumption is unjustified and highly questionable.

"Radium-226 is similar to calcium in its chemical properties and is highly fractionated in phosphate wastes and waste water.

"In particular one should look at the distribution of soluble uranium in the waste water and in contaminated groundwater of reclaimed Florida phosphate land areas.

"Only recently the contamination of groundwater by soluble uranium from uranium mines and uranium mills has been recognized as a potentially serious problem in Colorado and other uranium mining areas."

Reference to the bottom of page 64: "For completeness uranium-238 and Pb-210 should be added

T-33

70

to this list.

"Both are bone seekers and the uranium-238, as well as the polonium-210, emit alpha radiation and contribute to the risk of bone cancer and leukemia.

"The concentration of these isotopes should be assessed in drinking water and in cereal grains, other vegetable foods and dairy products in and near reclaimed phosphate lands.

T-34

"These two isotopes also should be included in the list of radionuclides measured in dust particles."

Reference page 77, paragraph 6: "Here again it is "assured" that the uranium is present in equilibrium with radium in the phosphate fertilizer product.

T-35

"However, Spalding and Sackett showed that uranium is readily leached from phosphate fertilizers by water.

"Thus light concentrations of uranium isotopes are to be expected in waste waters and groundwaters in and downstream of phosphate production sites and in wells and streams through reclaimed lands."

Reference page 78, paragraph 3: "It is stated here that "Community water systems shall not exceed

71

15 picocuries per liter of gross alpha (including radium-226 but excluding radon and uranium).

"The combined radium-226 and radium-228 shall not exceed 5 picocuries per liter.

"The lack of a soluble uranium standard for water quality here is a very serious omission. Recently, Dr. W.L. Lappenbusch, EPA Office of Radiation Programs, has proposed a water standard of 10 picocuries per liter for soluble uranium radionuclides (mainly uranium-238 and 234). T-36

"Based on current knowledge, this is not necessarily a conservative standard. Based on studies by Dr. Miriam P. Finkel, Argonne National Laboratory, bone tumor risk for uranium and radium are very nearly the same per unit of alpha activity in bone.

"Uranium also gives rise to cancer in the kidney. The bone uptake and retention of uranium is very much higher in young children than adults. The relative risks for uranium and radium should take into account both the relative uptake and retention on a cumulative basis for chronic exposure. The distributions in bone also may be very important.

"Per unit activity, plutonium-239, which is highly non-uniform in bone, gives rise to a ten times higher bone tumor risk than radium-226. T-37

72

"Chronic exposure is the uranium distribution in human bone similar to that of radium-226. The risk may be expected to vary.

"The need for a drinking water standard for Pb-210, which is a bone-seeking radionuclide, and polonium-210, which emits alpha radiation, should also be considered. T-38

"Radon in the water supply is an added source of indoor radon progeny for all residents in the affected areas."

Reference page 72, lines seven through ten: "The EPA proposed standards cited here, 0.020 working level total exposure to radon progeny, including background, represents a substantial risk that may not be acceptable for public exposure when its full cancer risks are known by the general public.

"Lifetime exposure to 0.020 working level will give rise to about 3,000 excess lung cancer deaths per 100,000 people.

"Actually, EPA concedes this could be as high as 5,000 excess lung cancer deaths per 100,000.

"In addition, it is now evident that this level will also give rise to a large increase in skin cancer risks. T-39

"Dr. Martell estimates that lifetime exposure

to 0.020 working level in houses and other structures will result in about ten times higher than the normal incidence of skin cancer."

Additionally, one rock dryer emits 64.5 tons per year of particulates and 2,450,000,000 picocuries of radium-226, an amount which exceeds the equivalent radionuclides which would be allowed by the Nuclear Regulatory Commission from a 1,000 megawatt nuclear power plant.

The two dryers proposed at this plant will emit 1,290 tons of particulates and 4,900,000,000 picocuries of radium-226. These emissions can be somewhat controlled, but not eliminated through scrubbers.

However, scrubbers have a high rate of failure and are only as good as their maintenance.. High stacks to aid dispersal of these radioactive residual particulates and pollutant gases over the county is hardly a satisfactory resolution of this problem.

Further, disposal of radioactive residue from these scrubbers pose another problem.

Therefore, despite scrubbers and stack dispersal, there can be no question that significant and dangerous to human health levels of radionuclides and particulates will continue to be emitted into our county air by the

proposed dryers.

Based on the latter, there can be no justification for the permitting of these rock dryers or, for that matter, mining as it is presently done.

Particulates from routine mining operations, transport of the rock and loading operations also create problems.

Among other things, they cause obstructive pulmonary changes, and alpha particulates, thought to remain in the lungs for years, also can cause death before cancer becomes evident.

As far as reclamation, the EIS says it will be too expensive for Estech to follow EPA recommendations for land cover of 3 to 4 feet of topsoil.

Actually, to date, there is no way to guarantee, either through home design or 3 to 4 feet of "relatively" radiation-free earth cover, freedom from adverse health effects while living on reclaimed lands.

There can be no doubt radioactive soil in reclaimed phosphate mining lands is a serious problem, so serious that overburden, waste sands and clay used for fill have been proposed for classification as "special" hazardous waste.

It is doubtful reclaimed lands can be safely used for housing. It is doubtful they can safely be

used for cattle or crop production either.

The EPA Phosphate EIS and other sources state consumption of foods (crop foods or beef) produced on reclaimed lands provide a route for secondary radiation impact exposures, and as Dr. Martell has pointed out, tests for other radioactive substances need to be done in these areas.

If this mining is permitted, we may experience a permanent decrease in agricultural lands. In fact, as radiological studies are made known, it may well be that phosphate mining constitutes a permanent use of the land.

Restoration of wetlands on this site is impossible because of changes in adjacent land terrain, alteration of the local hydrologic regime and changes in the particular constituents of the water.

To date, the creation of wetlands has never been successfully demonstrated.

T-40

Marsh-type reclamation projects will not replace the natural functions of the true marsh.

Mining, as it is proposed here, will destroy native vegetation, natural watersheds and the natural order of the soil's layers from top to bottom of the mined-out zone. Topsoils will be obliterated, breaking up the water-holding hard pan underlying most of the

76

property and will so change soil profiles and land contours as to irrevocably alter surface drainage patterns. Reclamation cannot restore these systems. T-41

Further, we ask that the Technical Staff of EPA's Air Quality Section further check the EIS Air Quality report for sufficiency and accuracy which we understand has not been done. We base this request on information obtained from the DER/Agrico vs. Freeport Sulphur/Sulphur Terminals Incorporated Administrative Hearing where this same preparer was used and where extremely serious omissions of data were found. (See attached information). T-42

We need to know if all emissions that could reasonably be anticipated and all the proposed emission points, including the most significant ones, were included for consideration in this EIS. T-43

There appears to be some question that the concentrations predicted by the Air Quality Display Model are reliable because of the nature of the emission estimates on which they were predicated. We quote page 42 of the EIS which says, "It is recognized that the utility of this estimation is highly dependent on the estimate of background concentrations. However, consideration of available facts will suggest, etcetera, etcetera." T-44

77

It should also be mentioned that cumulative effects of all mining operations presently permitted in our region plus Estech do not appear to have been adequately considered. Additionally, the impact of the support activity, electricity generation -- in this case, the daily generation of 73,955 KVA to supply this facility, which will produce further deterioration of air quality -- does not appear to have been considered. T-45

What is listed as the hypothetical failure of the clay settling area embankment, more commonly referred to as a slime pond break, is not so unlikely, as we know from the recent FPL dam break.

It appears the effect of such a spill on our reservoir as described in the EIS may be understood and based on assumptions which appear to be questionable. Also, a number of rather important facts are not discussed, such as how much it will cost to return the reservoir to operating condition. T-46

Predicating the short-term effects of this hypothetical spill on the "instant mixing of the 1,000 acre feet of clear water discharge from the clay settling area with the minimum of 6,920 acre feet of reservoir storage does not appear realistic. T-47

Careful reading will show the water flow into the reservoir will be reduced because of waste clay

damming the stream involved. This will mean a reduction of 9 to 12 million gallons a day of water flow to the reservoir, leaving the slime to ooze in.

Considerable evidence exists to assume expensive installation of new drying beds and probably new lagoon facilities and other new equipment would be necessary if this reservoir could ever operate again. The speed with which the EIS says this area is supposed to be revegetated again is questioned. Further, based on the conclusion of a Tampa Bay Regional Planning Council 208 consultant, it is doubtful the reservoir could ever be used again for a potable water source. If it were possible, the expense in rendering it operable would be catastrophic. T-48

EIS projections regarding radioactive levels, total suspended solids, etcetera, after the spill appear quite optimistic. We ask EPA thoroughly to examine these projections and the basis for them. T-49

As far as probabilities of a dam break are concerned, we are talking about our public-drinking water supply upon which the overwhelming number of people in Manatee County and many in Sarasota County rely. It will take only one spill to put us out of business.

While the EIS sees recharge for our groundwater 79

aquifer as posing no problem, accumulated information shows injection through connector wells of surface aquifer water, long in contact with radioactive materials, into deeper zones of different and generally higher chemical quality, prior to mining, will further contaminate our groundwater with radioactive materials. T-50

Monitoring, as proposed here, has not prevented this from happening nor have adequate remedies to protect our groundwater from this contamination been successfully implemented in other mining areas.

As to cumulative effects, even before any mines are operating in Manatee County, SWFWMD staff members estimate the amount of water from mining operations presently injected into our Florida aquifer, which provides water for thousands of Floridians and has been designated by SWFWMD as the best potential source of drinking water for Sarasota County, is already between 25 and 30 million gallons a day.

In order to protect our groundwater from further contamination, we recommend against this proposal. Recharge wells should not be permitted until radiation problems are solved.

Further, based on such evidence as exists, to intimate, as the EIS does, that contaminated groundwater will remain under the mining site for the T-51

foreseeable future or will migrate only a short distance is, at best, unscientific.

Our surface water will be severely impacted from this proposed mining. It should be noted the cumulative effects of more than one mining operation have not been considered. T-52

The water resource regime will be changed before mining even begins when all vegetation is stripped from an area. This will eliminate plant evapotranspiration, intake of water from the soil and the release of water from all living plant tissues. T-53 Small climate changes will result which can significantly alter rainfall regime. Natural flow patterns and storage capacities will be irretrievably altered. Runoff patterns will be demolished as will be natural recharge areas.

The runoff from this mining tract now contributes 11.6 percent of the total flow into the Manatee River. Even with such reductions as are possible with controls, T-54 we can expect steady deterioration of the Lake Manatee watershed as a result of normal discharge of phosphate wastes.

The average runoff of 11.8 million gallons a day from this site will be just as polluted as are the discharges going into the Peace and Alafia Rivers. 81

Mining of minor tributaries and bayheads adjacent to major streams will also further contribute to water degradation.

For a minimum of two months of the year, 1.959 million gallons a day will be discharged from point two into the East Fork of the Manatee River; three months of the year, 1.773 million gallons a day will be discharged into the North Fork. This means Estech will dump in the neighborhood of 36,700 gallons per minute of excess water into the North Fork of the Manatee.

Aside from the hazards of radioactivity and the residue of known carcinogen reagents used in the flotation process, the EIS concedes that federal/state standards for total suspended solids, total phosphorus and fluorides will be exceeded for varying amounts of time up to 14 percent.

Additionally, we are told fluoride concentrations, based on acceptable methods of data projections, cannot meet the state standards at a station near to the Manatee County water plant intake.

However, we are told Swift will regularly monitor effluent water quality at the permitted points of discharge to assure compliance with NPDES permit conditions and that these discharges of effluents will not noticeably alter water quality.

T-56

82

Of course, accumulated levels of fluorides, solids, phosphorus, reagents and radium will adversely affect water quality and permit accumulations of harmful materials. It will just be accomplished, perhaps, at permitted levels.

Further, the company saying, when the situation can be corrected, that it is too expensive to clean up or prevent this degrading to water quality discnarge from entering the North Fork is not cause for reassurance nor is the fact that monitoring abuse is prevalent throughout the industry and that water quality cannot be checked often by our regulatory personnel.

We can think of no justification for permitting new source discharges of pollutants that should be terminated by 1985 anyway. This discharge is clearly not in the public interest and should not be permitted.

The 13 million gallons a day, after 3 years 10 million gallons a day, withdrawal by Estech from the deep ground water system will further divert water that normally seeps through the aquifer south and west through Sarasota. This withdrawal may permit further salt water intrusion into our groundwater.

The proposed rerouting of a portion of the East Fork of the Manatee River will inevitably lead to degradation of water quality, if permitted.

T-56

The decline of water quality and quantity from this proposed mining is inevitable and it will exerts its effect upon all water consumers.

Time does not permit a detailed examination of the economic impacts of this proposed facility. Suffice it to say, it poses no positive benefit to the area, region or nation. Carefully reviewed, it can only be considered an economic negative.

Finally, it appears several parts of this EIS may be faulty, and we cannot, until they are investigated and proven to be correct, accept it as accurate.

In line with its responsibilities to protect the public health, we ask EPA to select the no-action alternative. To do otherwise, when sufficient evidence exists to demonstrate the damaging effects of this industry as it is now operated, is abdicating that responsibility.

Thank you.

(Applause)

MR. PERRY: Thank you, Mrs. Rains. I would ask that, because of the highly technical nature of your comments, that you might leave your telephone number with the court reporter so that she could call.

MRS. RAINS: I omitted quite a lot.

MR. PERRY: I'd now like to recognize Archie Fernald.

84

MR. FERNALD: I'm sure anything I was going to say has been presented far better than I can present it.

I do hope that --- Manatee County is in concert with Sarasota and their statement.

MR. PERRY: Thank you, sir.

Now I'd like to recognize Mary P. Green (sic), who is with Manatee Save Our Bay. Greer; excuse me.

MS. GREER: I really haven't much to say, but I wanted to speak up for the senior citizens in this area.

(Applause)

Many of the senior citizens of this county came here to preserve their health and to prolong their lives.

Many of us have respiratory distress and emphysema. We need clean air and clear water to live. Since we form a rather large percent of Manatee County's population, we depend on our county environmental protection agency to take care of us and protect us.

Allergist specialist, Dr. R. Layne's studies show a clear relationship between the rise and fall of chemical pollution levels and hospital admissions. National and state existing standards do not protect these senior citizens but gauge their air quality

85

standards on healthful young people.

Additional studies also show increases in chemical pollutants, such as nitrogen oxide, sulphur oxide and the radioactive gases called phosphate and uranium release, harmful to respiratory health.

These released pollutant gases are known carcinogens. A Florida Health and Rehabilitative Service investigation showed the region of Borden Chemical Plant to be a most infected area.

With the accumulated pollutants from three more phosphate companies, we human beings will be the next endangered species. We senior citizens are depending upon public health and the EPA to protect our lives, to protect our air and water quality in Manatee County.

We hope you will refuse further pollutant industries.

(Applause)

MR. PERRY: Thank you, Ms. Greer.

Mr. Gerald Stern indicated that he perhaps would want to speak.

MR. STERN: No. It's all been said and much better than I could say it.

MR. PERRY: Thank you, then.

Mr. Archie E. Brumfield, Vice-president of M.S. French

86

Company.

MR. BRUMFELD: Mr. Perry, the Board, members of this audience, I would like to thank you for this opportunity to talk briefly on the subject, mainly for the phosphate industry.

Over the past ten years the phosphate industry, I know, has spent millions of dollars in protecting the protection and improvement of the environment, not only in Polk County; in Hillsborough County.

The state of the art in this industry is changing continuously. Good old American ingenuity continues to play a very important part in this project, in this mining industry.

I know for a fact, and we've been very actively involved in developing processes with the phosphate company in reducing and hopefully eliminating the phosphate slime ponds, and I would like for you to consider the fact of the amount of money and the amount of time and the amount of effort that all these men and women have spent in looking through all of the processes, looking at all the problems and trying to find resolutions for those.

Please don't look at Polk County as a representative sample of what you may end up getting.

Personally, I live in Manatee County. I've been

here for twenty years. I don't want to see our county like that either, but I do hope that you give people an opportunity to expand, not only the technology it takes, but also the integrity of this country.

We are now being hamstringed by the oil industry, and I don't want to see it done by the phosphate .. people.

Thank you.

(Applause)

MR. PERRY: I'd now like to recognize Connie J. Pounders.

MS. POUNDERS: I feel that the people who have already spoken presented their facts very clearly.

MR. PERRY: You do not wish to speak, then? All right.

Hilda E. Quy. Quy; excuse me.

MS. QUY: I'm Hilda Quy. I live in Bradenton. I'm a member of the Izaak Walton League, Save Our Bays, Sierra Club, Manasota-88.

Much of what I had planned to say fortunately has been said by someone else, so I'm going to be rather briefer than I would have been otherwise, and I think it shows that many of us have the same concerns, and I think you appreciate that.

I want to refer first to page two, Project History

of the EIS: "Other local state and federal permit applications are in various phases of development ---"

This should be corrected to show that the Manatee County Commission last August voted 4 to 1 to deny the special exception applied for by Estech. T-57

That decision was entirely within the authority of the local legislative body. Many concerned local citizens objected to the first application to mine in our county because phosphate mining threatens our environment, our health and our quality of life.

We objected to the second, the third and the fourth applications, citing cumulative increasing dangerous effects.

When Swift, the fourth company, applied, our County Commission denied the permit, in our opinion weighing the significance of the cumulative effect of several mines.

Nowhere in the EIS do I find reference to this cumulative factor. I ask you, the United States Environmental Protection Agency, at what point you would be concerned with the cumulative effect of an industry that you know to be hazardous? T-58

Would it be the tenth mine or the one hundredth or when a dragline has walked over every square inch of vacant land in Manatee County?

Our local governing body has said this far and no farther. How can you, the Environmental Protection Agency, do any less?

Second, I would like to question, as others have, the objectivity of Conservation Consultants, Incorporated, which has prepared part of this report. This company is employed by Port Manatee, whose present and potential profitability is closely linked to the phosphate business for the port. The firm has a financial interest in increased phosphate business of the port, creating a clear conflict of interest by participation in preparation of this EIS. T-59

In addition, the firm's employer, the Port Authority, is made up of our County Commissioners. Estech is now involved in litigation with our County Commission.

Conservation Consultants may be incapable of recognizing a conflict of interests, but it is astonishing that EPA has cooperated in such a violation of professional ethics. In fact, without commenting any further, it appears that holding a hearing at this time may well be a serious interference in the judicial process. T-60

It's impossible in just a few short minutes to deal with the substantive issues in this EIS. Many of them have already been covered very competently by

longer and technical presentations. I just want to mention two or three things that struck me as I went through the report.

First of all, as others have pointed out, the most significant and courageous decisions of the area-wide EIS study were ignored. The last page of the summary sheet states that the operation "will be sufficient in terms of minor medical treatment, water supply, fire and pollution protection."

Within the last two weeks, an explosion and fire at the International Mining and Chemical Company in Bradley Junction required fire fighting units from Bartow, Lakeland, Mulberry, New Wales, and four units from MacDill Air Force Base in Tampa. So much for self-sufficiency. As usual, the taxpayer foots the bill.

T-61

On page 23, under the no-action alternative, we read, " --- a potential for positive impact on the United States balance of payments would be lost due to unrealized sale of the rock product --- "

Some others have referred to this. If this simplistic argument is permitted in a supposedly serious document, an unbiased statement, we must also add that as 6 percent of the world's population, we are using 30 percent of the world's fossil fuels. Nearly half of it

91

is imported.

Our unfavorable balance of trade is due to our excessive use and importation of oil, and furthermore, at our present rate of mining and exportation of phosphate, the United States will be dependent on imports of fertilizer in as little as two decades.

Dr. Ellis Verink, Chairman of the University of Florida Material Science and Engineering Department, recently said, "Many indicators suggest that non-fuel materials will represent the next national crisis for the United States." An OPEC-type fertilizer cartel can then hold us hostage as easily as we are held hostage by oil producers today.

You cannot throw in a glib one-sided remark about balance of trade without some semblance of unbiased treatment of the issue.

T-62

On page 103 there are outlined various measures to prevent the possibility of a settling area, otherwise known as slime pond, failure and release of waste clay to the Manatee River. These mention " --- designed by an experienced professional engineer, thorough investigation of foundation and soil conditions, daily inspection by qualified representatives, annual inspection by a Registered Professional Engineer," and so forth.

In February of 1972, June of '76, November of '77

92

and October of this year, we have had serious dam breaks. No doubt, in each case, the dam was designed by a so-called Registered Professional Engineer who surely would have said that the chance of failure was nil.

On page 52 of the EIS we read, "Limitations on use of the surface soils for construction of homogeneous pond embankments are considered severe."

Who will be out there watching that none of these poor soils are used in slime pond embankments? Registered Professional Engineers have been unable to restore the Peace River since a slime pond break killed it many years ago.

The truth is, dam safety in Florida is in limbo. Responsibility is ambiguously shared among the DER, Corps of Engineers and water districts with inspection meagerly funded.

These Estech slime ponds will contain vast quantities of hazardous waste. The drinking water of many thousands of people is at stake if a dam should fail.

Jim Hunter referred to the definition of wilderness. I don't think many dictionaries would give you this.

Section 4.12, Biology and Ecology, if we have

T-63

9

wilderness area, the wilderness area will consist of spoil piles, which will be allowed to become revegetated by natural means. The vegetation of similar sites throughout the central Florida phosphate district consists of woodlands, which do not closely resemble any indigenous plant communities in structure or species composition.

If you've seen Polk County, you know an understatement when you hear one.

Later we read, "The steepness of the slopes will retard the establishment of more luxuriant vegetation. This vegetation will have a low aesthetic value. The angle of slope will cause continual erosion in wet seasons."

Before this I think even the author of the document bled a little because he said this area, termed "wilderness" by the Applicant, will result in permanent parallel rows of steeply-sloped island chains in the northernmost created lake, and I think that's a very strange definition of wilderness.

From your million dollar area-wide study, you in the Environmental Protection Agency know that the phosphate industry poses serious dangers to the environment and to mankind. I read that you reported in June that Florida phosphate mines pose radiation hazards to

T-84

94

local residents that could increase risks of lung cancer by as much as 50 percent.

You know that Florida has three times as much chemical waste as any other state, much of it from Polk County's phosphate industry.

It's hard to understand how you can complacently give your stamp of approval to create more of the same against the wishes of the people of Manatee County and our own local government, and I ask you simply take another look at your name, the Environmental Protection Agency, and act accordingly.

By that, I mean deny the permits that are requested by Estech.

Thank you.

(Applause)

MR. HAGAN: Can we get a copy of your written statement?

MS. QUY: Yes, I can give you one. I'll have to just cut out a few things, then.

MR. PERRY: Thank you, ma'am.

MR. HAGAN: If you would, at your convenience, between now and December 14th, just drop it in an envelope and mail it to us.

MS. QUY: I can give it to you tonight. I'll just make a few little corrections.

T-65

95

Yes, I'll send it to you. That's the best thing.

MR. HAGAN: Thank you.

MR. PERRY: Mr. Joe Christy? I'm having a hard time with the handwriting. I presume it's Joe Christy. It says President of --- It looks like The Granary.

A VOICE FROM THE AUDIENCE: He left.

MR. PERRY: Cara Johnson?

MS. JOHNSON: I don't have anything to say.

MR. PERRY: That concludes, I believe, all of the people who have registered to speak.

Are there any other persons present tonight who would like to make a statement?

(No response)

MR. PERRY: Are there any other comments from the panel?

MR. BRYANT: I would just like to make a statement, that contrary to apparently the public opinion here, the Department of Environmental Regulation has not made any decision on this, and it is under consideration for certification.

We are in the process of reviewing the volumes of the EIS ourselves, so we appreciate your comments tonight.

I intend to get copies of the statements that were

submitted and read those very carefully and thoroughly and go back and review and look at the EIS in comparison to the comments that were made and make some recommendations of our own to EPA.

And those recommendations will also be available to the public.

A VOICE FROM THE AUDIENCE: Sir, may I ask a question? Are you going to address yourself to the questions that were raised about the fact that this is in litigation at the moment? Are you going to consult your legal staff to see if you do have standing at the moment to make any kind of decision while this is in litigation?

MR. BRYANT: Yes, ma'am. Yes, ma'am. As far as the State of Florida is concerned, I intend to speak with our attorneys to see what our situation would be in regard to ongoing local litigation in opposition to this project.

A VOICE FROM THE AUDIENCE: Does the same hold true for EPA?

MR. PERRY: EPA's counsel is here. We will consider it, yes, ma'am.

Are there any other comments?

MR. HAGAN: I'd like to make just one general comment, that as usual, I have been involved in several

97

hearings, in several meetings, formal and informal, in this area of Florida on several different issues, and as always the response from the public sector tonight has been an intelligent, reasonable, well thought-out and extremely articulately presented response.

This is a Draft Environmental Impact Statement. The purpose for a draft is to engender discussion and to raise questions which are in the public's concern and in the public's interest, and I would like to thank and compliment all the speakers tonight for having done that in a very excellent manner.

(Applause)

MR. PERRY: I would like to thank the State of Florida for being here tonight, and also, most importantly, I'd like to thank each and every one of you on behalf of the State of Florida and EPA for participating with us here tonight.

The comment period on the Draft Environmental Impact Statement, as we've stated here, I think several times, will remain open until December 14th, 1979. I believe that's a Friday, and the comment period will close at the close of business on that day.

This will allow anyone wishing to submit additional comments or written comments at the time to do so. Further submission must be in writing to be included

in the official record and should be sent to the attention of Mr. John E. Hagan, Chief of the EIS Branch, EPA, Region IV, 345 Courtland Street Northeast, Atlanta, Georgia, 30308.

EPA will take into consideration the elements in the statements made here tonight and those that are submitted and made a part of the record between now and December 14th, and we'll undertake to make a determination regarding the permit, NPDES permit, based on these comments and other comments and materials in the record.

After making that determination, we will then inform all the persons who've come here tonight, as well as those making additional comments, of our determination. This will be a final determination of the agency, and the agency decision respecting the permit will be included in the final Environmental Impact Statement for the Estech facility.

I wish to thank you again for appearing here tonight. If there's no further business ---

Yes, sir?

A VOICE FROM THE AUDIENCE: I'd like to ask a question. We came in, and we filled out a card, and I ask that we be --- Whatever the EPA will mail us, how much of what happened tonight are we going to receive copies

99

of?

MR. HAGAN: The process is that a verbatim transcript, which is being kept by our court reporter, is a part of the final Environmental Impact Statement, along with EPA's responses to the issues that have been raised, so the entire transcript of tonight's proceedings will be included in that document.

A VOICE FROM THE AUDIENCE: Thank you.

MR. PERRY: Are there any other matters?

If not, I think that the meeting is adjourned.

(Whereupon, at 9:55 p.m. the hearing was concluded)

C E R T I F I C A T E

This is to certify that the attached proceedings before THE ENVIRONMENTAL PROTECTION AGENCY, REGION IV in the Matter of:

Draft Environmental Impact Statement Public Hearing

Manatee Junior College
Bradenton, Florida

7:30 p.m.

November 28, 1979

were held as herein appears and that this is the original transcript for the file of the Agency.

ANNE JAPOUR
Official Reporter

-oOo-

101

RESPONSES TO TRANSCRIPT COMMENTS

Response T-1
See Response W-97

Response T-2
See Response W-17

Response T-3
See Response W-2

Response T-4
See Response W-9

Response T-5
See Response W-3

Response T-6
At the request of Sarasota County and as a result of an agreement between Manatee County, Sarasota County, Estech General Chemicals Corporation and the State of Florida Department of Community Affairs, additional borings and attendant radiological analyses have been performed. Please see Section 4.0 - Supplemental Analyses for a discussion of the results of this program and a comparison of this latest effort with the results and conclusions of the Draft EIS.

Response W-7
See Response W-6

Response T-8
See Response W-7

Response T-9
See Response W-9

Response T-10
See Response W-10

Response T-11
See Response W-14

Response T-12
See Response W-15

Response T-13
See Response W-16

Response T-14
See Response W-17

Response T-15
See Response W-18

Response T-16
See Response W-20

Response T-17
See Response W-21

Response T-18
See Response W-22

Response T-19
See Response W-26

Response T-20
See Response W-27

Response T-21
See Response W-28

Response W-22
See Response T-6

Response T-23
See Response W-125

Response T-24
See Response W-126

Response T-25
See Response W-130

Response T-26
See Response W-90

Response T-27
See Response W-130

Response T-28
The proposed reclamation plan incorporates many innovative procedures and methodologies not typically associated with past mining operations. Preservation of wetland and upland biological communities, a single above-ground clay wastes disposal area, extensive water recirculation and sand/clay mix disposal are several features relatively unique to the mining industry and represent the present state-of-the-art in reclamation and disposal. For this reason, Estech's reclamation plan can not be usefully compared to other plans by Estech or others.

Response T-29
Estech General Chemicals Corporation (Estech) is a wholly owned subsidiary of Estech Incorporated. Approximately twelve percent of the mining operation is owned by Japan investors who currently receive product from Estech and are expected to continue to receive product from the Duette Mine. The Japanese interest is the only foreign investor in the Estech mining operation and is the only foreign investor who wants to export phosphate.

Response T-30
See Response W-117

Response T-31
See Response W-3

Response T-32
See Response W-38

Response T-33
See Response W-39

Response T-34
See Response W-40

Response T-35
See Response W-41

Response T-36
See Response W-42

Response T-37
See Response W-43

Response T-38
See Response W-44

Response T-39
See Response W-45

Response T-40
See Response W-49

Response T-41
See Response W-50

Response T-42
See Response W-51

Response T-43
See Response W-52

Response T-44
See Response W-53

Response T-45
See Response W-54 & 55

Response T-46
See Response W-56

Response T-47
See Response W-57

Response T-48
See Response W-58

Response T-49
See Response W-59

Response T-50
See Response W-60

Response T-51
See Response W-61

Response T-52
See Response W-96

Response T-53
See Response W-63

Response T-54
See Response W-64

Response T-55
See Response W-65

Response T-56
See Response W-67

Response T-57
See Response W-109

Response T-58
See Response W-110

Response W-59
See Response W-111

Response T-60
See Response W-112

Response T-61
See Response W-114

Response T-62
See Response W-115

Response T-63
See Response W-116

Response T-64
See Response W-117

Response T-65
See Response W-118

6.0 LIST OF PREPARERS

United States Environmental Protection Agency

A. Jean Tolman	Project Officer
Andrea E. Zimmer	Previous Project Officer
Robert B. Howard	Chief, EIS Preparation Section
John E. Hagan, III	Chief, EIS Branch
Charles P. Albus	NPDES Permit
Ronald Rowland	NPDES Permit
Thomas R. Cavinder	Surface Water
A. Eugene Coker	Groundwater
Delbert B. Hicks	Biology and Ecology
William L. Kruczynski	Biology and Ecology
James E. Orban	Noise
Brian Mitchell	Air
Roger Pfaff	Air
Richard Payne	Radiation
Joel G. Veater	Radiation

Conservation Consultants, Inc.

William W. Hamilton	Senior Project Manager
H. Clayton Robertson	Assistant Project Manager
Andre F. Clewell, Ph.D.	Biology and Ecology
Richard M. Eckenrod, P.E.	Surface Water Quality
Byron E. Nelson	Noise
John F. Schatmeyer, Ph.D., P.E.	Air Quality

Civil Engineering Consultants, Inc.

Robert J. Lombardo, P.E., I.T.E.	Transportation

Leggette, Brashears, & Graham, Inc.

Frank H. Crum	Groundwater
Harry F. Oleson, Jr.	Groundwater

Planning/Marketing Services, Inc.

David E. Wilkinson	Socioeconomics

Zellars-Williams, Inc.

Michael E. Zellars	Project Manager, Geology
Douglas E. Blows	Water Balance, Mining Engineering
Luther H. Bumgardner	Geology, Mining Engineering
W. H. Hawkins	Soils
Ronald R. Potts	Water Discharge
James M. Williams, P.E.	Process Engineering
Mickey R. Lee	Geotechnical Engineer, Waste Disposal
John P. Bunch	Geologist, Waste Disposal

Consultants

Melvin W. Anderson, Ph.D., P.E.	Surface Water Hydrology
Emmett Bolch, Ph.D., P.E.	Radiation
Roger T. Grange	Archaeological & Historical Properties
J. Raymond Williams	Archaeological & Historical Properties

7.0 FINAL ENVIRONMENTAL IMPACT STATEMENT COORDINATION LIST

Copies of the Final Environmental Impact Statement are being sent to the following Federal, State and local agencies, public officials, organizations and interest groups.

Federal Agencies

Bureau of Outdoor Recreation
Bureau of Mines
Coast Guard
Corps of Engineers
Council on Environmental Quality
Department of Agriculture
Department of Commerce
Department of Health, Education and Welfare
Department of the Interior
Department of Transportation
Energy Research and Development Agency
Federal Highway Administration
Fish and Wildlife Service
Food and Drug Administration
Forest Service
Geological Survey
National Park Service
Nuclear Regulatory Commission
Economic Development Administration

Members of Congress

Honorable Lawton Chiles
United States Senate

Honorable Sam Gibbons
U.S. House of Representatives

Honorable Skip Bafalis
U.S. House of Representatives

Honorable Richard Stone
United States Senate

Honorable Andy P. Ireland
U.S. House of Representatives

State

Honorable D. Robert Graham
Govenor

Patrick K. Neal
State Senator

Department of Administration
Department of State
Environmental Regulation Committee

Ralph H. Haben, Jr.
State Representative
Lawrence F. Shackleford
State Representative
Thomas E. Danson, Jr.
State Representative
Ted Ewing
State Representative
Coastal Coordinating Council
Department of Natural Resources
Department of Agriculture and Consumer Services
Geological Survey
Game and Freshwater Fish Commission
Department of Commerce
Department of Health and Rehabilitative Services
Bureau of Intergovernmental Relations
Department of Environmental Regulation

Interest Groups

The Fertilizer Institute
Florida Phosphate Council
Florida Audubon Society
Florida Sierra Club
Manasota 88
League of Women Voters
Conservation Council of Manatee County
Tampa Audubon Society
Florida Department of the Environment
Izaak Walton League of America Florida Divison
Florida Wildlife Federation

Local and Regional

Polk County Commission
Hillsborough County Commission
Manatee County Commission
DeSoto County Commission
Hardee County Commission
Charlotte County Commission
Sarasota County Commission
Tampa Bay Regional Planning Council
Sarasota County Health Dept.
Hillsborough County Dept. of Environmental Protection
Manatee County Department of Pollution Control
Sarasota County Environmental Control Department
Southwest Florida Water Management District

8.0 APPENDICES

		Page
8.1	Draft NPDES Permit	409
8.2	PSD Permit Application - Preliminary Determination	422
8.3	Supplemental Radiological Data	446

8.1 DRAFT NPDES PERMIT

Permit No. FL0036609

DRAFT

AUG 13 1980

AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act, as amended, (33 U.S.C. 1251 et. seq; the "Act),

Estech General Chemicals Corporation
(formerly Swift Agricultural Chemicals Corporation)
1st Commercial Bank Building
410 Cortez Road, West
Bradenton, Florida 33507

is authorized to discharge from a facility located at

Duette Mine
Between East and North Forks Manatee River
about latitude 27° 31' 09" & longitude 82° 07' 13"
Manatee County, Florida

to receiving waters named

East and North Forks of Manatee River

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II and III hereof.

This permit shall become effective on

This permit and the authorization to discharge shall expire at midnight,

Date Signed _____

DRAFT

AUG 13 1980

_____
Sanford W. Harvey, Jr.
Director
Enforcement Division

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AUG 13 1980

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning on the effective date and lasting through the term of this permit, the permittee is authorized to discharge from outfall(s) serial numbers 001, 002 and 003 - process generated wastewater and mine dewatering water.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	Daily Average	Daily Maximum	Measurement Frequency (During Discharge)	Sample Type
Flow-m^3/Day (MGD)	—	—	Continuous	Recorder
Total Suspended Solids	30 mg/l	60 mg/l	1/week	24 Hr. Composite
Total Phosphorous (as P)	3.0 mg/l	9.0 mg/l	1/week	24 Hr. Composite
Total Fluoride (as F)	5 mg/l	10 mg/l	1/week	24 Hr. Composite
Temperature (Winter)	$55^o \pm 10^oF$	—	1/week	Grab
Temperature (Summer)	$85^o \pm 10^oF$	—	1/week	Grab
Biochemical Oxygen Demand (5-day)	2.9 mg/l	10 mg/l	1/week	24 Hr. Composite
Copper * (above background concentration)	0.01 mg/l	0.03 mg/l	1/week	24 Hr. Composite
Oil & Grease	5 mg/l	15 mg/l	1/week	24 Hr. Composite
Specific Conductance mhos/cm @ 25^oC	500 or less	1000 maximum	1/week	24 Hr. Composite
Radium 226	—	9 pCi/l	1/month	24 Hr. Composite

* See Page 3 of 12 - Definitions, 2(e)

The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored 1/week during discharge with a grab sample.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

The effluent limits and any additional requirements specificed in the attached certification supersede any less stringent effluent limits listed above. During any time period in which more stringent state certification effluent limits are stayed or inoperable, the effluent limits listed above shall be in effect and fully enforceable.

DRAFT
AUG 13 1980

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following locations: nearest accessible point after final treatment but prior to actual discharge or mixing with the receiving stream. A single monitoring station located upstream of discharge point 001 (diversion to Reservoir) shall be employed for sampling discharges 001 and 002. Separate flow measurement capability shall be provided for discharges 001 and 002. A separate monitoring station shall be provided for discharge point 003.

Any overflow from facilities designed, constructed, and maintained to contain or treat the volume of wastewater which would result from a 10-year, 24-hour precipitation event shall not be subject to the suspended solids effluent limitation or the pH limitations listed on the preceding page. Monitoring and reporting shall be required for all the parameters including TSS and pH.

2. DEFINITIONS

(a) The term "mine dewatering" shall mean any water that is impounded or that collects in the mine and is pumped, drained, or otherwise removed from the mine through the efforts of the mine operator. However, if a mine is also used for the treatment of process generated wastewater, discharges of commingled water from the mine shall be deemed discharges of process generated wastewater.

(b) The term "10-year, 24-hour precipitation event" shall mean the maximum 24-hour precipitation event with a probable re-occurrence interval of once in 10 years. This information is available in "Weather Bureau Technical Paper No. 40, May 1961 and may be obtained from the Environmental Data Service, Nation Oceanic and Atmospheric Administration, U.S. Department of Commerce.

(c) The term "mine" shall mean an area of land, surface or underground, actively used for or resulting from the extraction of a mineral from natural deposits.

(d) The term "process generated wastewater" shall mean any wastewater used in the slurry transport of mined material, air emissions control, or processing exclusive of mining. The term shall also include any other water which becomes commingled with such wastewater in a pit, pond, lagoon, mine or other facility used for settling or treatment of such wastewater.

(e) For the purposes of this permit, background concentration shall be the greater of:
1) Copper concentration measured in groundwater withdrawn for facility use, or
2) Copper concentration measured in surface water reservoir at time the reservoir is initially filled by diversion from the East Fork Manatee River. This value shall be determined before any discharge to Reservoir has occurred.

B. SCHEDULE OF COMPLIANCE

1. The permittee shall achieve compliance with the effluent limitations specified for discharges in accordance with the following schedule:

   a. Permittee shall comply with the effluent limitations by the effective date of the permit.

   b. This permit shall be modified, or alternatively, revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under sections 301(b)(2) (C), (D), (E), and (F), 304(b)(2), and 307(a)(2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:

      (1) Contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or
      (2) Controls any pollutant not limited in the permit.

      The permit as modified or reissued under this paragraph shall also contain any other requirements of the Act then applicable.

2. No later than 14 calendar days following a date identified in the above schedule of compliance, the permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

DRAFT

AUG 13 1980

C. MONITORING AND REPORTING

1. *Representative Sampling*

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

2. *Reporting*

Monitoring results obtained during the previous 3 months shall be summarized for each month and reported on a Discharge Monitoring Report Form (EPA No. 3320-1), postmarked no later than the 28th day of the month following the completed reporting period. The first report is due on . Duplicate signed copies of these, and all other reports required herein, shall be submitted to the Regional Administrator and the State at the following addresses:

Environmental Protection Agency
Water Enforcement Branch
345 Courtland Street, N.E.
Atlanta, Georgia 30365

3. *Definitions*

a. The "daily average" discharge means the total discharge by weight during a calendar month divided by the number of days in the month that the production or commercial facility was operating. Where less than daily sampling is required by this permit, the daily average discharge shall be determined by the summation of all the measured daily discharges by weight divided by the number of days during the calendar month when the measurements were made.

b. The "daily maximum" discharge means the total discharge by weight during any calendar day.

4. *Test Procedures*

Test procedures for the analysis of pollutants shall conform to regulations published pursuant to Section 304(g) of the Act, under which such procedures may be required.

5. *Recording of Results*

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

a. The exact place, date, and time of sampling;

b. The dates the analyses were performed;

c. The person(s) who performed the analyses;

DRAFT

AUG 13 1980

d. The analytical techniques or methods used; and

e. The results of all required analyses.

6. *Additional Monitoring by Permittee*

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report Form (EPA No. 3320-1). Such increased frequency shall also be indicated.

7. *Records Retention*

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation shall be retained for a minimum of three (3) years, or longer if requested by the Regional Administrator or the State water pollution control agency.

DRAFT
AUG 13 1980

A. MANAGEMENT REQUIREMENTS

1. *Change in Discharge*

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit. Any anticipated facility expansions, production increases, or process modifications which will result in new, different, or increased discharges of pollutants must be reported by submission of a new NPDES application or, if such changes will not violate the effluent limitations specified in this permit, by notice to the permit issuing authority of such changes. Following such notice, the permit may be modified to specify and limit any pollutants not previously limited.

2. *Noncompliance Notification*

If, for any reason, the permittee does not comply with or will be unable to comply with any daily maximum effluent limitation specified in this permit, the permittee shall provide the Regional Administrator and the State with the following information, in writing, within five (5) days of becoming aware of such condition:

a. A description of the discharge and cause of noncompliance; and

b. The period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

3. *Facilities Operation*

The permittee shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit.

4. *Adverse Impact*

The permittee shall take all reasonable steps to minimize any adverse impact to navigable waters resulting from noncompliance with any effluent limitations specified in this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

5. *Bypassing*

Any diversion from or bypass of facilities necessary to maintain compliance with the terms and conditions of this permit is prohibited, except (i) where unavoidable to prevent loss of life or severe property damage, or (ii) where excessive storm drainage or runoff would damage any facilities necessary for compliance with the effluent limitations and prohibitions of this permit. The permittee shall promptly notify the Regional Administrator and the State in writing of each such diversion or bypass.

AUG 13 1980

DRAFT

6. *Removed Substances*

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters.

7. *Power Failures*

In order to maintain compliance with the effluent limitations and prohibitions of this permit, the permittee shall either:

a. In accordance with the Schedule of Compliance contained in Part I, provide an alternative power source sufficient to operate the wastewater control facilities;

or, if such alternative power source is not in existence, and no date for its implementation appears in Part I,

b. Halt, reduce or otherwise control production and/or all discharges upon the reduction, loss, or failure of the primary source of power to the wastewater control facilities.

B. RESPONSIBILITIES

1. *Right of Entry*

The permittee shall allow the head of the State water pollution control agency, the Regional Administrator, and/or their authorized representatives, upon the presentation of credentials:

a. To enter upon the permittee's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit; and

b. At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring method required in this permit; and to sample any discharge of pollutants.

2. *Transfer of Ownership or Control*

In the event of any change in control or ownership of facilities from which the authorized discharges emanate, the permittee shall notify the succeeding owner or controller of the existence of this permit by letter, a copy of which shall be forwarded to the Regional Administrator and the State water pollution control agency.

3. *Availability of Reports*

Except for data determined to be confidential under Section 308 of the Act, all reports prepared in accordance with the terms of this permit shall be available for public

inspection at the offices of the State water pollution control agency and the Regional Administrator. As required by the Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Act.

4. *Permit Modification*

After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

5. *Toxic Pollutants*

Notwithstanding Part II, B-4 above, if a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Act for a toxic pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in this permit, this permit shall be revised or modified in accordance with the toxic effluent standard or prohibition and the permittee so notified.

6. *Civil and Criminal Liability*

Except as provided in permit conditions on "Bypassing" (Part II, A-5) and "Power Failures" (Part II, A-7), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.

7. *Oil and Hazardous Substance Liability*

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act.

8. *State Laws*

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the Act.

DRAFT

AUG 13 1989

9. *Property Rights*

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

10. *Severability*

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

PART III

Definitions

1. The "daily average" concentration means the arithmetic average (weighted by flow value) of all the daily determinations of concentration made during a calendar month. Daily determinations of concentration made using a composite sample shall be the concentration of the composite sample. When grab samples are used, the daily determination of concentration shall be the arithmetic average (weighted by flow value) of all the sample collected during that calendar day.

2. The "daily maximum" concentration means the daily determination of concentration for any calendar day.

3. "Weighted by flow value" means the summation of each sample concentration times its respective flow in convenient units divided by the summation of the respective flows.

4. Composite Sample: A "24-hr. composite sample" is any of the following:

   a. Not less than six influent or effluent portions collected at regular intervals over a period of 24 hours and composited in proportion to flow.

   b. Not less than six equal volume influent or effluent portions collected over a period of 24 hours and composited in proportion to the flow.

   c. An influent or effluent portion collected continuously over a period of 24 hours at a rate proportional to the flow.

5. For the purpose of this permit, a calendar day is defined as any consecutive 24-hour period.

DRAFT

AUG 13 1980

National Environmental Policy Act (NEPA) Requirements

The below listed requirements, conditions and limitations were recommended in Estech General Chemicals Corporation Duette Mine site specific Environmental Impact Statement, and are hereby incorporated into National Pollutant Discharge Elimination System permit, No. FL0036609, in accordance with 40 CFR §122.62(d)(9). (May 19, 1980)

1. Estech shall exclude the utilization of any conventional aboveground slime-disposal areas with the exception of one 480-acre initial aboveground clay storage area. Estech's waste disposal and reclamation plan shall employ a sand-clay mix process as described in the EIS. The 480-acre aboveground settling area shall be inactivated and reclaimed a minimum of one year before cessation of mining activities at the site.

2. Estech shall meet the requirements of its Southwest Florida Water Management District (SWFWMD) Consumptive Use Permit.

3. Estech shall provide storage that allows recirculation of water recovered from slimes. The water circulation system and storage capacity shall be as described in the EIS for Estech's proposed activity.

4. Estech shall meet county and state reclamation requirements.

5. Estech shall preserve from mining, or any other disturbance, the 18-acre cypress stand and the 50-acre stand of sand pine scrub as described in the DEIS and shown on Figure 4.12-1 of that document.

6. Before beginning any land-disturbing activities, Estech shall contract with a qualified individual approved by the Florida Endangered Species Coordinator to recover eastern indigo snakes from the mine site for relocation to a suitable area. The recovery and relocation efforts and schedule shall be coordinated with the Florida Endangered Species Coordinator. Estech shall also familiarize its employees who will work in the field with the appearance of the snake and instruct them as to its preservation.

7. Estech shall comply with the categorization of wetlands present on the mine property as set forth in the EIS and illustrated in Figure 6-1 of the DEIS. In summary, within Category 1 wetlands, Estech shall not mine, shall limit activities to those essential to and unavoidable for the mining operation, and shall otherwise take all reasonable efforts to preserve all Category I wetlands. Additionally, Estech shall restore all Category 2 wetlands in accordance with Estech's restoration plan in the EIS.

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8. Estech shall preserve the Carruthers Mound from any mining or construction disturbance. To insure its preservation, no buildings, roadways, pipelines, excavations or ground disturbance shall occur within 400 feet of the mound. Estech shall erect a clearly marked fence at a minimum radius of 400 feet from the mound except on the southeastern quadrant which is protected by the preservation of the river and floodplain. Following the cessation of mining and construction activities, Estech shall remove the fence. An additional buffer outside the 400-foot radius shall be maintained within which no mining will be undertaken. This area will be defined by the limits of mining projected by the permittee as follows: 2,150 feet to the west of the mound; 1,020 feet to the south of the mound; and, 620 feet to the north of the mound. In the event the permittee's mining projections are revised, the buffer may be adjusted upon concurrence by the Advisory Council on Historic Places.

9. Estech will cooperate fully with the National Ocean Survey (NOS) in protecting and/or in relocating any geodetic control survey monuments determined to be located in the project area which may be disturbed by Estech's operations at the project site. Estech shall provide NOS at least ninety (90) days notice prior to the proposed relocation of any monument. The funding required for protection and/or relocation of the monuments shall be provided by Estech.

10. Unless specified otherwise by a preceding condition in this permit, Estech shall carry out its Duette Mine project in accordance with the applicant's proposal described and evaluated in the Estech EIS, including the employment of mitigating measures set forth in the EIS.

8.2 PSD PERMIT APPLICATION - PRELIMINARY DETERMINATION

APPLICATION PSD-FL-036

PRELIMINARY DETERMINATION

I. Applicant

Estech General Chemicals Corporation
410 Cortez Road West
Bradenton, Florida 33507

II. Location

The applicant proposes to construct rock mining facilities in the town of Duette in Manatee County, Florida. Duette is located approximately 19 miles east of the town of Parrish, off highway 62. The various facilities will be located at the following UTM coordinates: Boiler 389.18E and 3047.63N; Rock Dryers 388.95E and 3047.28N; Silos 388.72E and 3047.32N; and product Loading Stations 388.73E and 3047.18N.

III. Project Description

The proposed source is a phosphate rock mine and associated processing plant. Air pollution emitting facilities at this source include the following:

- Boiler (3.99 MMBTU/hr)
- Two fluid bed dryers (290 tons material input/hr each)
- Eight dry rock storage silos (3750 ton storage capacity)
- Two dry rock loading stations (200 ton bin capacity)

The applicant proposes to use a fuel oil fired 100 horsepower package boiler to generate steam for heating purposes. Heat is required to maintain flotation reagents at proper temperatures for process use and to preheat No. 6 fuel oil so that it can be pumped to the two phosphate dryer oil burners. The boiler will be fired with low sulfur distillate fuel having a nitrogen content of 0.4 percent and a sulfur content of 0.7 percent.

The two fluidized bed dryers will dry phosphate rock from about 13 to 2 percent moisture. (The dryers remove moisture by passing heated air through the fluidized bed of rock). The air is heated by combustion of fuel oil in the air stream directly before entering the fluidized bed. Large size, heavy components of product exit the fluidized bed dryer to a product conveyor and the lighter components are carried along with the fluidizing air to product recovery cyclones which remove economically

TABLE 1. EMISSIONS SUMMARY

Facilities	POTENTIAL EMISSIONS TONS PER YEAR								ACTUAL EMISSIONS TONS PER YEAR							
	Fugitive Dust	Fugitive TSP	TSP	SO_2	CO	HC	NO_x	Fluoride	Fugitive Dust	Fugitive TSP	TSP	SO_2	CO	HC	NO_x	Fluoride
Package Boiler	--	--	0.25[a]	12.4[a]	0.62[b]	0.12[b]	9.94[c]	--	--	--	0.25[a]	12.4[a]	0.62[b]	0.12[b]	2.73[c]	--
Phosphate Rock Dryers (2)	--	--	45,486[d]	904[c]	28.8[e]	5.76[e]	418[c]	<100	--	--	85.4[c]	32.0[c]	28.8[e]	5.76[e]	264[f]	0.15[c]
Dry Rock Storage	--	--	10,028[d]	--	--	--	--	--	--	--	30.8[f]	--	--	--	--	--
Dry Rock Loading Station	--	--	4,095[d]	--	--	--	--	--	--	--	25.3[f]	--	--	--	--	--
Mining and Reclamation	43.1[c]	--	--	--	--	--	--	--	43.1[c]	--	--	--	--	--	--	--
Wet Phosphate Rock Storage Pile	--	77.2[c]	--	--	--	--	--	--	--	47.5[c]	--	--	--	--	--	--
TOTAL	43.1	77.2	59,609.3	916.4	29.42	5.88	427.94	<100	43.1	47.5	149.25	44.4	29.42	5.88	266.3	0.15

a. Calculated by applicant in the FDER construction permit application section of the PSD application.

b. Calculated by using emission factors given in Table 1.3-1 of AP-42.

c. Calculated by applicant in the BACT application section of the PSD application.

d. Calculated from data supplied by applicant in the FDER construction permit application section of the PSD application.

e. Listed by applicant in Air Quality Resource Document section of the PSD application.

f. Based on allowable emission limit and maximum allowable yearly hours of operation.

recoverable product from the gas stream. Product recovered by the cyclones is also discharged to the product conveyor. The remaining hot gas is cleaned in a wet scrubber and vented to the atmosphere.

The eight Dry Rock Storage Silos are designed to hold production output for relatively short periods of time and supply product to the Dry Rock Loading Stations on demand. The input rate is consistent with production of the two phosphate rock dryers and the output rate designed for optimum and effective shipment of product. Fugitive emissions generated during product transfer and silo loading are captured by hoods and collected in a silo loading scrubber.

The two dry rock loading stations are each designed with a compartmented 100 ton loading bin. Each bin is designed to discharge through eight spouts into the hatches of a 100 ton railroad hopper car. The bin loading collection systems exhaust into a single wet scrubber serving both loading bins. The rail car loading spouts are designed to enclose the car hatch openings and include necessary air inflow and dust capture features to prevent fugitive dust release during the car loading operations. A single wet scrubber is designed to serve both car loading dust collection systems on an alternating basis.

IV. Source Impact Analysis

The proposed construction has the potential to emit greater than 100 tons per year of TSP, SO_2 and NO_x as shown in Table 1. Therefore, in accordance with the provisions of Federal Regulation 40 CFR 52.21 promulgated 19 June 1978, Prevention of Significant Deterioration (PSD) review is required for these pollutants. It should be noted that the application was reviewed under the Partial Stay of PSD Regulation, published February 5, 1980 and the proposed revisions of the PSD regulations referenced in that partial stay. It was determined that the exemption outlined in the partial stay does not apply and that the proposed source is subject to review under existing PSD regulations because it has greater than 100 TPY enforceable post-control TSP and NO_x emissions.

Full PSD Review includes an analysis of the following:

- air quality impacts (National Ambient Air Quality Standards (NAAQS) and PSD increments),
- monitoring data,
- Best Available Control Technology (BACT),

- growth impacts,
- visibility soils, and vegetation impacts,
- Class I area impacts.

However, the applicant proposes installing wet scrubbers, which will reduce the actual SO_2 emissions to a total of 44.4 tons per year (refer to Table 1). Under 40 CFR 52.21 (k), major modifications with allowable emissions less than 50 tons per year, 1000 pounds per day, or 50 pounds per hour, as appropriate, are exempted from the requirement of NAAQS and increment analyses, monitoring data, growth impact analysis and visibility, soils and vegetation analyses, unless the allowable emissions from the source would impact a Federal Class I area or an area in which the PSD increments are known to be violated. Furthermore, under 40 CFR 52.21 (j), no such source need apply BACT to get a PSD permit but must demonstrate that the source meets all applicable emission limitations under SIP and all applicable emission standards and standards of performance under 40 CFR part 60 and part 61. These exemptions apply to emissions of SO_2 only; full PSD review is required for TSP and NO_x.

A. BACT Analysis

TSP

Total suspended particulate emissions are capable of being generated from all of the facilities proposed for construction (refer to Table 1). Since TSP emissions are greater than 100 tons per year under 40 CFR 52.21 (j) these facilities are required to apply best available control technology for TSP.

The applicant proposes to utilize two Ducon wet venturi-absorber scrubbing systems to collect particulate and gaseous pollutants from the phosphate rock dryers. Particulate emissions from transfer points are proposed to be enclosed and eventually vented to a dust collection system. The captured TSP emissions from the dryers will be exhausted to a Centrifield wet scrubber.

The design outlet rate for the Ducon scrubbing system as indicated by the supplier is 0.022 gr/DSCF. Based on an estimated inlet concentration of 12.0 gr/DSCF this is equivalent to a collection efficiency of 99.82 percent for the system. The design outlet rate for the Centrifield scrubber is listed as 0.022

gr/DSCF by the manufacturer of the control device. Based on an estimated inlet grain loading of 7.8 gr/DSCF this is equivalent to a collection efficiency of 99.71 percent for the Centrifield scrubber. The total particulate emission from the phosphate rock dryers using the aforementioned emission rates is estimated to be 22.93 lb/hr or 85.4 tons/yr (refer to Table 1). This emission rate compares favorably with the 0.04 lb TSP per ton of material proposed New Source Performance Standard for phosphate rock dryers. Using the above emission rate, particulate emissions from the proposed phosphate rock dryers for 590.3 tons/hr of material processed (wet basis) are 23.61 lbs/hr.

Also proposed for construction is a dry rock storage facility consisting of eight storage silos with a storage capacity of 3,750 tons. The silos will be arranged in two bays of four silos each centered over two enclosed reclaim belt conveyors which load the rail car transfer stations. An enclosed dry product conveyor of 600 tons per hour capacity (from the rock dryers) will deliver dry rock to a distribution chute and discharge to an enclosed reversible conveyor belt. The reversible belt will supply either one of two tripper conveyors which traverse the length of each bank of silos. All transfer points in the loading system that lead to the tripper conveyors are proposed to be enclosed and ventilated with exhaust hoods to prevent TSP emissions. Silo discharge gates to the reclaim conveyors will also be enclosed with fugitive TSP collection hoods to prevent escape of particulate matter at the base of the silos. All active transfer points will be enclosed and ducted to scrubbers. A schematic of the silo storage and reclaim fugitive dust control system is given in Figure 1. The outlet grain loading for the Centrifield scrubbers as listed by the manufacturer is 0.022 gr/DSCF. The collection efficiency of the Centrifield scrubbers is estimated to be greater than 99.7 percent. This is comparable to the collection efficiencies for other control devices such as fabric filters and centripetal vortex contact scrubbers.

The two dry rock loading stations at Duette Mine are proposed to be installed with wet Centrifield scrubbers. Each dry rock

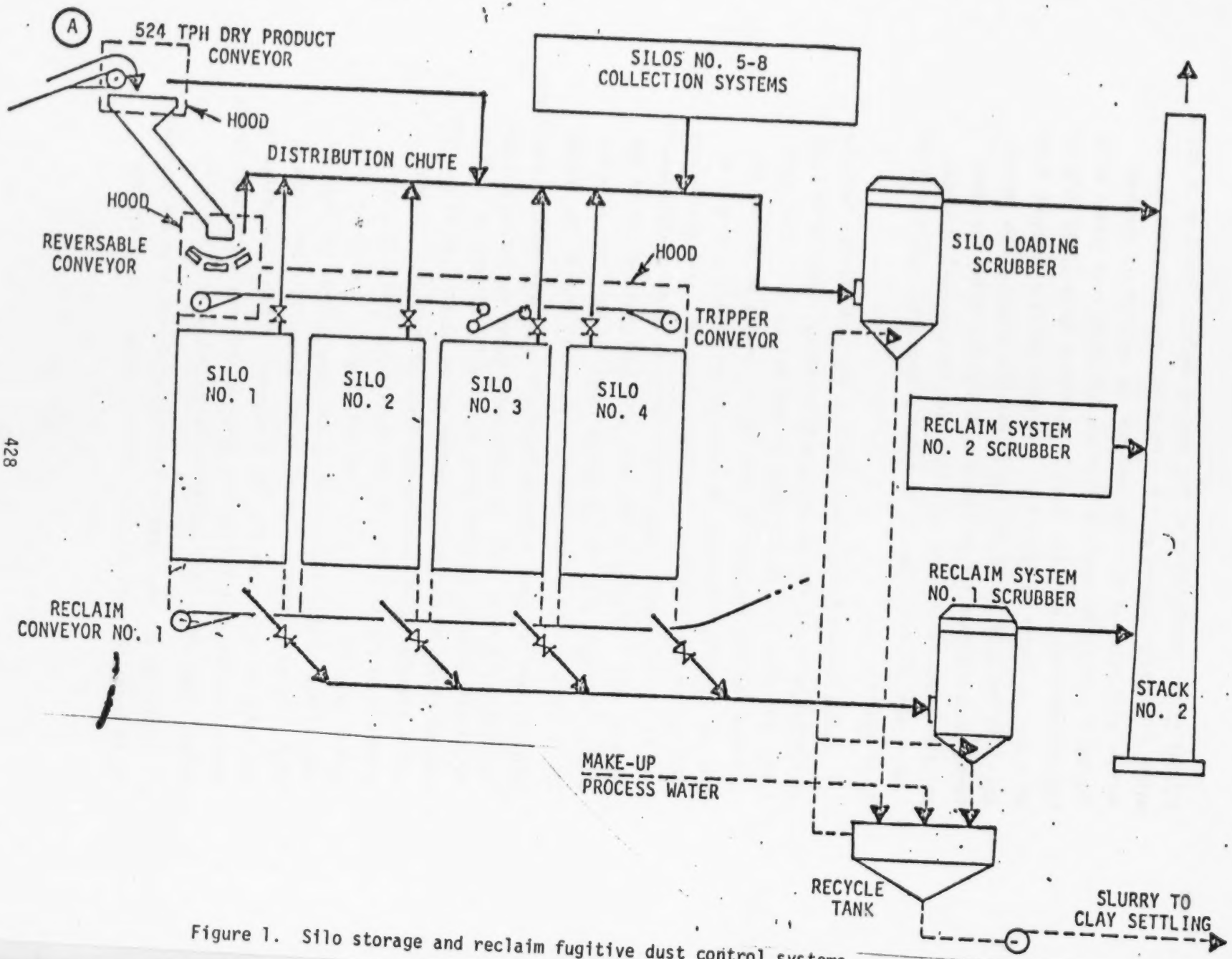


Figure 1. Silo storage and reclaim fugitive dust control systems

loading station consists of a compartmented 100 ton washing bin on load cells as illustrated in Figure 2 . The bins will be loaded with enclosed, variable speed conveyor belts through hooded hoppers and a distribution chute system. Each bin will discharge through eight spouts into the hatches of a 100 ton railroad hopper car. Fugitive TSP emissions at all transfer points are designed to be captured by collection systems. The captured emissions are ducted to Centrifield wet scrubbers. The outlet grain loading of the scrubbers is listed as 0.022 gr/DSCF by the manufacturer. The collection efficiency of the scrubbers is estimated to be 99.72 percent. This is comparable to the collection efficiencies of 99.7 percent listed for alternative control devices such as the fabric filter and the wet centripetal vortex contact scrubber.

The oil fired package boiler will use distilate fuel as a means of limiting TSP emissions. The boiler TSP emissions are estimated to be 0.057 lb/hr or 0.25 tons per year. EPA agrees that this rate meets BACT for TSP for the boiler and no additional controls are required.

The applicant estimates that mining and reclamation activities will disturb approximately 3 acres of land on any given day. However, since the material handled is in a relatively moist condition at the time it undergoes active disturbance, a limited amount of fugitive emissions will be generated.* As the mining and reclamation activities constantly move into new areas, disturbed ground surfaces are left behind which contribute to fugitive dust emissions. It is estimated that this would contribute up to 43.1 tons per year of fugitive dust emissions. Control measures such as water spraying in cases like these are not quite effective due to accessibility problems of these areas by light vehicles and the subsequent generation of fugitive dust by these vehicles even if such spraying is possible. A proposed long term measure suggested by the applicant is the introduction of interim vegetative cover, i.e., grass, as soon as practical after completion of activities which disturb the ground surface. The new vegetation will encourage establishment of more permanent natural grasses and plants and help to

*Verified by EPA-450/3-78-030 "Air Pollution Control Techniques For The Phosphate Rock Industry." No fugitive emissions are anticipated from quarry operations.

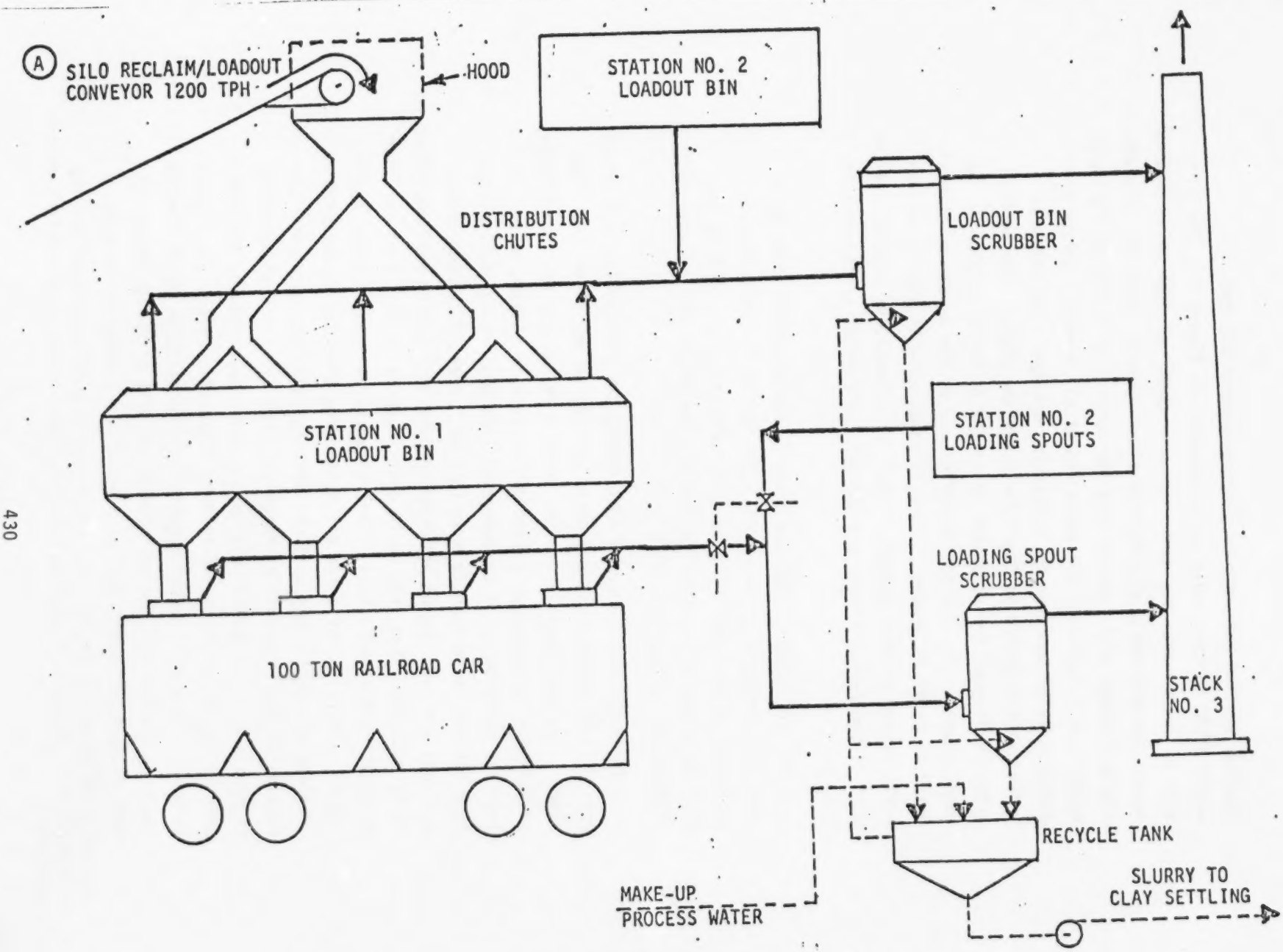


Figure 2. Dry rock loading fugitive dust control system.

reduce emissions from these areas to levels approximating preconstruction conditions.

The storage piles at Duette Mine will be loaded with a movable double wing stacker. The material loaded to the pile will essentially be saturated with excess moisture. The inherent nature of the storage materials is expected to contribute to an overall estimated control efficiency of 38.4 percent. This estimate was based on emission factors developed from the expanded methodology provided in Table 2, Technical Guidance Document EPA 450/3-77-010. No external controls are projected to be required.

$\underline{NO_x}$

The two primary sources of nitrogen oxide emissions are 1) the Oil Fired Package Boiler and 2) the two phosphate rock dryers. Nitrogen oxides generated by mobile sources such as haul trucks, etc., are not subject to PSD review.

The control of nitrogen oxide emissions in boilers is generally performed by combustion modification techniques. However, recently some developmental work has been done on flue gas treatment techniques. The applicant however proposes to utilize neither one of the above techniques to reduce NO_x emissions from the 3.99 MMBTU/ hr package boiler but intends to rely solely upon the use of low nitrogen distillate fuel oil instead of residual fuel oil containing 0.4 percent nitrogen by weight. Estimates indicate the use of distillate fuel oil will reduce NO_x emissions by as much as 72.5 percent over emissions as calculated by AP-42 techniques from firing the residual fuel oil originally proposed by the applicant.

The control technique proposed for the reduction of NO_x emissions from the phosphate rock dryers is use of low nitrogen (0.3 percent nitrogen weight) Number 6 residual fuel oil and low NO_x burners. Also, some control of NO_x is expected when the dryer off-gases pass through wet scrubbing devices that have been designed for efficient removal of sulfur dioxide. Since no estimates are available for reduction in NO_x emissions obtained by the latter two techniques for phosphate rock dryers, a total of 32.6 percent reduction in NO_x emissions was estimated by the applicant due to

the use of low nitrogen fuel and an allowable NO_x limit of 0.32 lb/MMBtu was proposed. EPA disagrees with the proposed BACT for NO_x. The NSPS limit for industrial boilers firing liquid fuels is 0.30 lb/NO_x/MMBtu. Fuel bound NO_x formation from the dryers will be minimized through use of low nitrogen fuel. Further, dryers which require lower gas temperatures than boilers need not have higher thermal NO_x formation than occurs in boilers. Therefore, a well operated dryer should not emit greater NO_x than an industrial boiler. Finally, no justification for a lower limit for NO_x from rock dryers could be found and BACT for NO_x from the dryers is determined to be 0.3 lb/MMBTU. The combination low nitrogen fuel and low NO_x burners are capable technology for meeting the limit.

B. Increment Analysis

The applicant is required to demonstrate that the proposed source does not cause or contribute to a violation of any maximum allowable increments consistent with paragraph (l) of the PSD regulations. Increments have been defined for TSP and SO_2, however, allowable emissions of SO_2 are less than 50 tons per year, 1000 pounds per day and 100 pounds per hour and no increment analysis is needed for SO_2 consistent with the exemption in paragraph (k) of the PSD regulations. Therefore only the increment analysis for TSP is required.

The applicant used the EPA approved Air Quality Display Model (AQDM) for evaluating long-term air quality effects contributed by the proposed source. Meteorological input was represented by a five year period measured at the Tampa National Weather Service (NWS) Station. Modeling of the emissions from the proposed construction was performed in conjunction with 33 other increment consuming sources listed in Table 2. Annual air quality effect of increment consuming sources was determined for maximum allowable annual emission rates of all sources for comparison with the allowable annual mean PSD increment of 19 micrograms per cubic meter (refer to Table 3).

TABLE 2. INTERACTIVE SOURCE LIST

NEDS No.	Source Name	UTM Coordinates		Ht. (ft)	Diam. (ft)	Temp. °F	Flowrate (ACFM)	Allowed Particulates (lb/hr)	Operational Hours		
									Hours/Day	Days/Week	Weeks/Year
1800-102-1	Borden - Rock Dryer	394.7	3069.6	100	4.0	210	90,000	42.32	24	5	52
1800-102-2	Borden - Dry Rock Storage	394.7	3069.6	27	3.1	75	18,000	42.32	17.3	5	52
1800-102-3	Borden - Dry Rock Shipping	394.7	3069.6	26.5	1.1	70	18,000	50.44	5.8	5	52
1800-50-1	S.I. Lime - Bulk Terminal	362.9	3084.7	60	2.0	95	1,000	31.83	8	6	52
1800-8-44	Gardinier - Ammonia Phosphate Plant	362.9	3082.5	80	3.0	130	20,000	16.2	22	7	52
1800-8-45	Gardinier - Vessel Loading Facility	363.2	3082.3	3	2.3	72	16,000	40.0	24	1.5	52
1800-50-5	Chloride - Lead Oxide Transfer System	361.8	3088.3	40	1.5	125	5,500	12.88	24	5	50
1800-50-6	Chloride - Lead Oxide Kettle	361.8	3088.3	40	1.5	125	5,438	12.88	24	5	50
1800-29-6	Nitram, Inc. - Prill Tower No. 2	363.1	3089.0	200	22.6	90	150,000	27.28	16	7	50
3680-56-5	IMC Prairie - No. 4 Raymond	403.0	3087.0	65	2.0	140	6,300	19.2	24	5	52
3680-57-4	Conserv Chem. - Granulator	398.4	3084.2	211	3.2	180	35,000	30.98	24	7	52
3680-57-4	Conserv Chem. - Dryer	398.4	3084.2	201	3.52	140	44,000	31.41	24	7	52
3680-57-4	Conserv.Chem. - Sizing	398.4	3084.2	172	2.5	150	16,000	31.35	24	7	52
3680-52-15	C.F. - Phosphate Rock Unloader to Silos	408.2	3082.9	45.3	4.5	77	37,000	41.89	24	7	52
3680-55-23	Agrico - GTSP Production	407.9	3071.0	140	9.0	107	156,000	49.6	22	7	52

TABLE 2. (Continued)

NEDS No.	Source Name	UTM Coordinates		Ht. (ft)	Diam. (ft)	Temp. °F	Flowrate (ACFM)	Allowed Particulates (lb/hr)	Operational Hours		
									Hours Day	Days Week	Weeks Year
3680-59-24	New Wales - Bag Collector AFI Shipping	396.7	3079.4	120	8.0	125	110,000	40.41	24	7	48
3680-59-25	New Wales - Limestone Storage	396.7	3079.4	50	1.0	80	4,000	33.33	24	7	48
3680-59-26	New Wales - Silica Storage	396.7	3079.4	18	1.0	77	1,500	14.99	24	7	52
3680-59-27	New Wales - Granulator Plant for AFI	396.7	3079.4	172	8.0	120	130,000	36.8	24	7	48
3680-59-28	New Wales - AFI Silos	396.7	3079.4	116	1.0	77	1,600	36.2	24	7	52
3680-59-29	New Wales - Railroad & Truck Shipping	396.7	3079.4	40	3.0	80	12,000	41.88	24	7	50
3680-59-30	New Wales - Soda Ash Unloading	396.7	3079.4	61	.66	77	1,500	16.76	8	7	50
3680-59-31	New Wales - Soda Ash Conveying	396.7	3079.4	45	1.0	77	1,500	15.00	8	7	50
3680-59-32	New Wales - A Kiln Cooler	396.7	3079.4	87	1.5	325	30,000	15.00	24	5	50
3680-59-33	New Wales - B Kiln Cooler	396.7	3079.4	87	1.5	325	30,000	15.00	24	7	50
3680-59-34	New Wales - Multifos Sizing	396.7	3079.4	17	1.25	225	10,000	23.00	24	7	50
3680-59-35	New Wales - Multifos Class. System	396.7	3079.4	57	1.25	175	6,000	18.44	24	7	50
3680-59-36	New Wales - Dryer & 2 Kilns	396.7	3079.4	172	4.5	100	43,000	18.41	24	7	50
3680-59-37	New Wales - DAP/MAP Loadout	396.7	3079.4	N/A	N/A	80	18,500	38.6	24	7	52
3680-59-38	New Wales - AFI Storage and Loading	396.7	3079.4	65	1.0	85	8,000	40.35	24	7	52

TABLE 2. (Continued)

NEDS No.	Source Name	UTM Coordinates		Ht. (ft)	Diam. (ft)	Temp. °F	Flowrate (ACFM)	Allowed Particulates (lb/hr)	Operational Hours/Day	Days/Week	Hours/Weeks/Year
3680-50-38	USS Agri-Chem. - DAP Facility	413.2	3086.3	133	7.0	90	110,000	34.35	24	7	52
3680-50-39	USS Agri-Chem. - DAP/MAP Storage & Loading	413.2	3086.3	74	2.0	80	30,000	43.12	4	7	52
2540-29-1	Manatee Energy - Splitter Boiler	346.6	3057.7	64	2.0	550	5,000	1.25	24	7	50
2540-29-1	Manatee Energy - Splitter Furnace	346.6	3057.7	100	3.0	550	9,100	5.75	24	7	50
1680-11-1	American Orange - Citrus Peel Dehydrator	419.8	3047.3	34.5	10.0	185	27,000	10.12	24	6	28
1680-11-2	American Orange - Citrus Pulp Dehydrator	419.8	3047.3	35.5	13.3	185	45,000	16.52	24	6	28

TABLE 3. CLASS II INCREMENTS

Pollutant	Averaging Time	Maximum Allowable Increases (Increments) Micrograms/Meter^3
Sulfur Dioxide (SO_2)	Annual Mean	20
	24 - Hr.	91[a]
	3 - Hr.	512[a]
Particulate Matter (TSP)	Annual Mean	19
	24 - Hr.	37[a]

[a] The applicable maximum allowable increase may be exceeded during one such period per year at any receptor site.

The results indicated the annual effect of all increment consuming sources at the point of maximum impact to be 1.4 micrograms per cubic meter, about 8 percent of the increment. Estimated annual effects of the increment consumers at the property boundaries ranged from 0.4 to 0.7 micrograms per cubic meter. Effect at the nearest population groups - Keentown and Duette was 0.5 and 0.4 micrograms per cubmic meter respectively.

Short-term air quality effects were computed from all allowable source emission rates listed in Table 1 using the PTMTP-W computer model and worst case (highest, second highest concentration) meteorology. Worst case meteorology was determined from CRSTER computer code analysis of five years of hourly meterological data. All major upwind increment consuming sources or source groupings were included in the model runs to identify maximum highest, second highest short-term concentrations within the proposed source's impact area irrespective of property boundaries and for two locations on property boundaries.

Short-term effects of all increment consuming sources at the worst two points of highest , second highest concentrations were found to be 12.9 and 9.8 micrograms per cubic meter. Increment consumption was therefore 12.9 micrograms per cubic meter or 35 percent of the allowable 37 micrograms per cubic meter (refer to Table 3) PSD increment at the point of maximum concentration. Increment consumption at the worst two property boundary locations were found to be 8.1 and 5.2 micrograms per cubic meter. Further analysis of short-term increments considering source interaction is determined to be unnecessary on the basis that the proposed source's impact area is small (~5 kilometers) relative to the distance from other sources (~20 kilometers) and no potential for serious interaction exists. The analysis adequately demonstrates preservation of the short term increments.

It must be noted that concentrations of particulate matter attributable to the increase in emissions from construction and other temporary activities were excluded from increment consumption in accordance with paragraph (iii) of 40 CFR 52.21 (j).

Further, fugitive TSP emissions from rock handling, etc. which do consume increment were not considered in the modeling analysis consistent with current Region IV policy. Region IV policy currently does not require modeling for fugitive TSP because of the controversy over the accuracy of currently available fugitive modeling techniques. In addition, fugitive dust emissions were treated as not consuming increment in accordance with PSD regulations.

C. NAAQS Analysis

The applicant must perform a NAAQS analysis to demonstrate that emission of TSP and NO_x do not threaten the NAAQS ceilings for these pollutants. As explained previously the source is exempt from air quality analysis of SO_2 emissions.

The NAAQS analysis is similar to the increment analysis discussed above. Ambient concentrations were determined for annual and 24 hour average conditions using the AQDM and a combination of CRSTER PTMTP-W computer runs, respectively, for several locations of worst effect. The grid spacing was 0.1 kilometers. The data presented in Table 4 indicates that NAAQS for these pollutants will not be violated as a result of the operation of the proposed facility. This assessment was performed by combining the calculated air quality levels contributed by the proposed source and surrounding sources to existing background levels. The background levels for TSP were obtained by measurement from six monitors located in the general vicinity of the proposed project location.

D. Soils, Vegetation, Visibility

The applicant has stated that no adverse impacts on soils or vegetation will result from the operation of the proposed new source. Any effect at all to the nearby agricultural lands, e.g., citrus, grazing pasture, etc., is expected to be beneficial due to the nutritive values of the phosphate and sulfur compounds contained in the particulate matter emissions. Plumes from the stacks will contain varying degrees of heated water vapor and will dissipate within a relatively short distance from the stack. Although plumes are aesthetically unattractive, in this case the landscape is not viewed as characteristically scenic and therefore the plume is not expected to detract from aesthetic values.

TABLE 4. AMBIENT AIR STANDARDS COMPARED TO CALCULATED CONCENTRATIONS AND BACKGROUND

Pollutant/Averaging Time	Background ($\mu g/m^3$)	Maximum Calculated[d] Concentrations ($\mu g/m^3$)	Total Concentrations	NAAQS ($\mu g/m^3$)
TSP				
- 24 hr	110.4[b]	12.8	123.2	150
- annual	29.2[a]	1.2	30.4	60
NO_2				
- annual	20[c]	1.0	21.0	100

[a] Based on the measured highest annual geometric mean for 1977-1978.

[b] Based on the highest second highest 24-hr measurement for 1977-1978.

[c] Yearly maximum annual average concentrations measured 6 miles from the source from 1974-1978 of 20 $\mu g/m^3$ was utilized as a conservative estimate of NO_2.

[d] Includes concentrations contributed by surrounding sources listed in Table II.

E. Growth Impacts

Vehicular travel on paved and unpaved roadways to and from the proposed source is expected to cause fugitive dust emissions. It is estimated that 325 employee vehicles and a smaller number of service and delivery vehicles will be using the paved access road to the plant. The construction work force during the construction period will also contribute to vehicular fugitive dust emissions. Population growth and commercial activities are not expected to develop in the immediate area of the mine.

F. Class I Area Analysis

No Class I area is within a radius of 100 Km of the proposed source. The Chassahowitzka National Wilderness Area is located approximately 130 Km to the north west of the proposed source. Approximately 200 Km to the south east is the Everglades National Park. Considering the modeling results which indicated acceptable ambient concentrations in the vicinity of the plant and the additional dispersion which will occur over this distance, no adverse impact on these Class I areas is expected from the proposed construction.

V. Conclusions

EPA Region IV proposes a preliminary determination of approval for construction of the phosphate rock mining facilities at Estech General Chemicals Corporation's Duette Mine in Manatee County, Florida proposed in their application received August 16, 1979. This approval is based on the information provided in their application and additional information received in correspondence dated August 21, 1979, January 22, 1980, and March 10, 1980. The conditions set forth in the permit are as follows:

1. The proposed construction will be in accordance with the capacities and specifications stated in the application. This specifically includes:

   a) Fluid bed phosphate rock dryers (2):

      - Maximum capacity - 262 tons/hr each (dry basis) or 290 tons/hr each (wet basis)
      - NO_x control technology - low NO_x burners
      - SO_2 control technology - wet dual alkaline scrubbers/low sulfur fuel.
      - Type of fuel used - Number 6 residual oil with nitrogen and sulfur content not to exceed 0.3 and 1 percent by weight, respectively.

TABLE 5. ALLOWABLE EMISSION RATES

Facility	TSP	NO_x	SO_2
Phosphate Rock Dryers (2)	22.93* lbs/hr and 0.098 lb/MMBTU heat input	71 lb/hr and 0.30 lb/MMBTU heat input	8.60 lbs/hr and .037 lb/MMBTU heat input
Package Boiler	0.057 lbs/hr and 0.014 lbs/MMBTU heat input	0.624 lb/hr and 0.16 lb/MMBTU heat input	2.82 lb/hr and 0.71 lb/MMBTU heat input
Dry Rock Storage Silos	8.74 lbs/hr		
Dry Rock Loading Station	5.77 lbs/hr		

* Corresponds to 0.04 lb TSP/Ton of Phosphate Rock Feed (Wet Basis)

b) Package boiler (1):

- Capacity - 100 HP
- Maximum heat input - 3.99 MMBTU/hr
- Type of fuel used - distillate oil with sulfur content not to exceed 0.7 percent by weight, respectively.

2. The allowable emissions limits for emission sources of TSP, NO_x and SO_2 are listed in Table 5.

3. Compliance with each allowable emissions limit listed in condition 2 will be determined by performance tests. Operation during these tests will be within 10% of the rated maximum capacity. Tests will be conducted with EPA standard methods and in accordance with the applicable provisions of 40 CFR 60.8. Testing of emissions will be carried out isokinetically with a minimum sampling volume of 30 dscf and a minimum sampling time of 60 minutes for each run and three runs per test. NO_2 grab samples will be obtained at 15 minute intervals.

4. The applicant is required to install, calibrate, maintain and operate a continuous monitoring system, and record the output from the system, for measuring the NO_x content of the flue gases from the phosphate rock dryers.

5. The following measures will be complied with for fugitive TSP and dust emissions:

   a) Speed limit on unpaved roads is not to exceed 20 miles per hour. In addition, unpaved roads are to be sprayed with water and where practical and environmentally safe, watering should be supplemented with dust suppressant chemicals.

   b) Speed limit on paved roads is not to exceed 30 miles per hour.

   c) Exposed areas due to mining and reclamation activities are to be revegetated as soon as possible or within one year from the time overburden is initially spread and graded.

   d) The top surface (to a depth of 6 inches) of material storage piles must be maintained at a moisture content of at least 13 percent.

6. The applicant will comply with the requirements and provisions of the attached general conditions.

7. The phosphate rock dryers will not operate greater than 7446 hours per year (365 day consecutive period) or in excess of the capacity and fuel limits listed in condition 1. To show compliance with these restrictions a log will be maintained daily which indicates for each dryer cummulative hours of operation for each preceding 365 day period and the time of each unit startup and shutdown. Unit startup is defined as the point at which combustion commences. In the dryer log, entries of startup times will be made prior to unit startup. The log also will contain a record of sulfur and nitrogen contents of all fuel oil fired in the dryers and the sulfur content of the fuel oil fired in the package boiler.

GENERAL CONDITIONS

1. The permittee shall notify the permitting authority in writing of the beginning of construction of the permitted source within 30 days of such action and the estimated date of start-up of operation.

2. The permittee shall notify the permitting authority in writing of the actual start-up of the permitted source within 30 days of such action and the estimated date of demonstration of compliance as required in the specific conditions.

3. Each emission point for which an emission test method is established in this permit shall be tested in order to determine compliance with the emission limitations contained herein within sixty (60) days of achieving the maximum production rate, but in no event later than 180 days after initial start-up of the permitted source. The permittee shall notify the permitting authority of the scheduled date of compliance testing at least thirty (30) days in advance of such test. Compliance test results shall be submitted to the permitting authority within forty-five (45) days after the complete testing. The permittee shall provide (1) sampling ports adequate for test methods applicable to such facility, (2) safe sampling platforms, (3) safe access to sampling platforms, and (4) utilities for sampling and testing equipment.

4. The permittee shall retain records of all information resulting from monitoring activities and information indicating operating parameters as specified in the specific conditions of this permit for a minimum of two (2) years from the date of recording.

5. If, for any reason, the permittee does not comply with or will not be able to comply with the emission limitations specified in this permit, the permittee shall provide the permitting authority with the following information in writing within five (5) days of such conditions:

   (a) description of noncomplying emission(s),

   (b) cause of noncompliance,

   (c) anticipated time the noncompliance is expected to continue or, if corrected, the duration of the period of noncompliance,

   (d) steps taken by the permittee to reduce and eliminate the noncomplying emission,

   and

   (e) steps taken by the permittee to prevent recurrence of the noncomplying emission.

   Failure to provide the above information when appropriate shall constitute a violation of the terms and conditions of this permit. Submittal of this report does not constitute a waiver of the emission limitations contained within this permit.

6. Any change in the information submitted in the application regarding facility emissions or changes in the quantity or quality of materials processed that will result in new or increased emissions must be reported to the permitting authority. If appropriate, modifications to the permit may then be made by the permitting authority to reflect any necessary changes in the permit conditions. In no case are any new or increased emissions allowed that will cause violation of the emission limitations specified herein.

7. In the event of any change in control or ownership of the source described in the permit, the permittee shall notify the succeeding owner of the existence of this permit by letter and forward a copy of such letter to the permitting authority.

8. The permittee shall allow representatives of the State environmental control agency or representatives of the Environmental Protection Agency, upon the the presentation of credentials:

   (a) to enter upon the permittee's premises, or other premises under the control of the permittee, where an air pollutant source is located or in which any records are required to be kept under the terms and conditions of the permit;

   (b) to have access to and copy at reasonable times any records required to be kept under the terms and conditions of this permit, or the Act;

   (c) to inspect at reasonable times any monitoring equipment or monitoring method required in this permit;

   (d) to sample at reasonable times any emission of pollutants;

   and

   (e) to perform at reasonable times an operation and maintenance inspection of the permitted source.

9. All correspondence required to be submitted by this permit to the permitting agency shall be mailed to the:

   Chief, Air Facilities Branch
   Air and Hazardous Materials Division
   U.S. Environmental Protection Agency
   Region IV
   345 Courtland Street
   Atlanta, Georgia 30308

10. The conditions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

The emission of any pollutant more frequently or at a level in excess of that authorized by this permit shall constitute a violation of the terms and conditions of this permit.

5.3 SUPPLEMENTAL RADIOLOGICAL DATA

May 6, 1980

MEMORANDUM

TO: J. Davis

FROM: R. Gonzalez

SUBJECT: Transmittal of Duette Radiological Data

Attached for your review and transmittal to Sarasota County.

RLG:ln

Enclosure

Reproduced from best available copy.

STATE OF FLORIDA

DIVISION OF ADMINISTRATIVE HEARINGS

ESTECH GENERAL CHEMICALS CORPORATION, formerly SWIFT AGRICULTURAL CHEMICALS CORPORATION,	•	CASE NO 79-1994
Petitioner,	•	
vs.	•	
MANATEE COUNTY, a political subdivision of the State of Florida, et al.,	•	
Respondent.	•	

AGREEMENT OF THE PARTIES

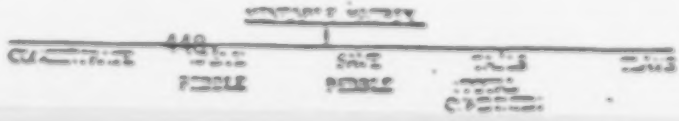
At the request of Sarasota County, the parties signing below agree that they shall conduct the following data collection program which will provide additional radiological data regarding Estech's Duette mine site.

Scope of Program

1. Twenty-seven (27) sample holes will be drilled on Estech's Duette mine site. The locations of these holes have been selected by Dr. Linzer and they correspond with the locations of the 1977-78 drill holes. The locations of the new sample holes have been selected in a manner which is intended to ensure that the previous mineable matrix sections can be used to delineate the matrix composite zone in each new hole. The identification and locations of these holes are set forth in Exhibit "A" (attached hereto).

2. For twenty-four (24) drill holes, the matrix will be composited and core washed. The -150 mesh fraction (clay) product from the washing will be representatively sampled and analyzed for percentage clays and radium -226 content. A sub-sample of the clays shall be set aside for Manatee and Sarasota Counties for potential clay characterization. The radiological analysis shall be made by a laboratory that is mutually acceptable to the parties.

3. For three (3) of the drill holes (see drill holes marked with an asterisk (*) on the attached Exhibit "A"), the matrix cores will be composited and core-washed. On each of the core samples the core-washing shall be made pursuant to the flow sheet below which identifies the products from washing and beneficiation.



MINEABLE MATRIX

CONCENTRATE	WHITE PEBBLE	SAVE PEBBLE	TAILS	TAILS

The analysis shall include a weight, EPL, and radium-226 analysis for all of the components, including the matrix. A radium 226 balance shall be made per the preceding flow sheet.

4. Subject to Dr. Lincer's concurrence, Estech shall select the drillers, geologist, core washing lab, analytical lab, and other contract personnel to expedite this program. A representative of Sarasota and/or Manatee County shall be given a reasonable opportunity to be present at, and monitor, all phases of the program.

5. It is agreed that the cores will be split vertically down the middle in the field. One half will be used as provided in paragraphs 1 through 4 for analysis and the other half will go to Manatee and/or Sarasota Counties for quality assurance testing.

6. The parties shall pay for this program on a pro-rata basis up to $10,000. Estech shall pay for all costs above $10,000 for the remainder of the data collection and analysis program set forth in paragraphs 1 through 4.

7. This Agreement shall be subject to ratification by the Board of County Commissioners of Sarasota and Manatee Counties and by the Department of Community Affairs which shall take place no later than March 28, 1980.

IN WITNESS WHEREOF, the parties have hereunto entered into this Agreement on this the 21st day of March, 1980.

ESTECH GENERAL CHEMICALS CORPORATION

BY: _____
HOPPING, BOYD, GREEN & SAMS, P.A.
Attorneys for Estech

MANATEE COUNTY

BY: _____
MANN AND FAY, CHARTERED
Attorneys for Manatee County

DEPARTMENT OF COMMUNITY AFFAIRS

BY: _____

SARASOTA COUNTY

BY: _____
NELSON, HESSE, CYRIL, WEBER & SPARROW
Attorney for Sarasota County

EXHIBIT "A"

SECTION	HOLE NUMBER
15	M-3
15	G-10
16	O-15
16	F-11
17	F-2
17	E-11
18	M-11
7	E-6
7	M-12
8	A-5
8	K-8
9	K-12
9	J-5
4	J-6
4	I-11
4	A-3
6	G-11
31	F-11
31	K-2
30	C-12
30	G-4
19	E-11
19	P-6
20	L-13
21	A-5
21	F-13
18	F-11

The closest hole to each of the locations identified above, with matrix thickness nearest to the average of the above twenty-seven (27) matrix thicknesses shall be selected as the three (3) special drill holes referred to in Paragraph 3 of the Agreement of the Parties.

DRILL HOLE LOCATIONS
AT EGCC DUETTE MINE

Section	Hole #		
15	H-3		
15	G-10		
16*	O-15		
16	F-11	changed to	J-8
17	F-2		
17	E-11		
18	H-11		
7	E-6		
7	M-12		
8	A-5		
8	K-8		
9	K-12		
9	J-5		
4	J-6		
4	I-11		
4	A-3		
6*	G-11		
31	F-11		
31	K-2		
30	C-13		
30	G-4		
19	E-11		
19	P-6		
20*	L-13	changed to	P-16
21	A-5		
21-	F-13	changed to	C-15
18	F-11	changed to	A-9

(Three samples for matrix and Ra_{226} balance)

* Closest hole to these locations, with matrix thickness closest to the average of the above 27 matrix thicknesses shall be analyzed for radiation balance.

Special Holes

E-11 Sec. 17
G-11 Sec. 6
F-13 Sec. 21 changed to C-15

Note: Due to wet field conditions, some hole locations were changed (with Dr. Lincer's approval)

Richard L. Gonzalez

Richard L. Gonzalez

ESTECH GENERAL CHEMICAL
CORE WASH PROCESSING DATA

Hole	Section	-150 Mesh	
		% Dry Weight	Ra226 pCi/gm*
J-6	4	16.6	4.78 ±0.28
A-3	4	13.3	12.9 ±0.6
K-12	9	31.9	2.97 ±0.15
I-11	4	15.2	3.0 ±0.24
J-5	9	21.6	14.0 ±0.7
F-2	17	15.7	3.62 ±0.18
K-8	8	14.2	11.27 ±0.56
E-6	7	22.4	7.9 ±0.4
A-5	8	16.1	5.8 ±0.5
H-11	18	24.0	7.5 ±0.4
M-12	7	22.9	8.6 ±0.4
F-11	31	27.4	3.49 ±0.22
C-13	30	26.0	4.86 ±0.60
G-4	30	22.5	12.79 ±0.64
H-3	15	23.2	5.23 ±0.31
G-10	15	19.4	4.65 ±0.44
E-11	19	19.7	3.80 ±0.29
J-8	16	18.6	11.4 ±0.57
A-9	18	25.6	6.04 ±0.30
K-2	31	32.0	3.56 ±0.17
A-5	21	29.7	2.94 ±0.28
P-16	20	18.5	5.88 ±0.29
P-6	19	29.7	6.65 ±0.33
O-15	16	24.0	4.91 ±0.25

* Data supplied by S. A. I.

ESTECH GENERAL CHEMICAL

CORE WASH PROCESSING DATA

Hole	Section	Sample Description	Wt. %	% BPL	Ra 226* pCi/gm
E-11	17	Matrix	100.0	12.99	4.99 ±0.25
		Concentrate Product	15.3	65.79	18.0 ±0.9
		Pebble Product	2.7	57.91	31.0 ±1.5
		Waste Pebble	0.5	52.98	21.4 ±1.1
		Tails	62.2	1.88	0.55 ±0.28
		Clays	19.3	7.74	3.47 ±0.47
G-11	6	Matrix	100.0	23.67	10.7 ±0.5
		Concentrate Product	16.0	66.77	23.4 ±1.2
		Pebble Product	7.0	59.69	29.7 ±1.5
		Waste Pebble	1.3	62.28	28.6 ±1.4
		Tails	57.1	1.56	0.48 ±0.08
		Clays	18.5	20.39	10.0 ±0.5
C-15	21	Matrix	100.0	21.58	7.04 ±0.39
		Concentrate Product	19.1	67.14	21.9 ±1.1
		Pebble Product	5.7	58.58	30.3 ±1.5
		Waste Pebble	2.4	45.66	23.1 ±1.2
		Tails	56.8	1.69	0.47 ±0.04
		Clays	16.0	17.45	6.84 ±0.34

*Data supplied by S. A. I.

ZELLARS-WILLIAMS, INC.
Geologists - Metallurgists - Engineers

April 16, 1980

Dr. Jeff Lincer
Environmental Specialist
P. O. Box 8
2002 Ringling Blvd.
Sarasota, FL 33577

Dear Dr. Lincer,

This letter documents transmittal of the matrix and slime samples from our Estech 27 hole core washing program. From each hole you have received one-half of the mineable matrix that was drilled and logged in the field and one 5-gallon container of -150 mesh clays from our core wash processing. The matrix from six holes was picked up by you on Friday, April 4. The remaining matrix samples and all of the -150 mesh clay samples were picked up and delivered to you by Delta Drilling and/or Eddie Balter on April 9 and April 10.

A sample inventory of the Estech samples forwarded to you is attached. A cross reference listing of our corresponding Zellars-Williams, Inc. lab numbers is included for clarity. Please verify this inventory and acknowledge receipt of these samples as shown below. Thank you very much for your cooperation.

Sincerely,
Zellars-Williams, Inc.

J. M. Williams
Executive Vice President

JMW/kw
Attachment

I acknowledge that the above document is correct and that we have received the forementioned Estech samples.

Jeffrey Lincer 4/22/8

4232 SOUTH FLORIDA AVENUE, LAKELAND, FLORIDA 33803 · 813/646-2991

ESTECH SAMPLES TO SARASOTA COUNTY
SAMPLE INVENTORY

Hole #	Section	Zellars-Williams Lab No.	Matrix	-150 Mesh Clays
J-6	4	MM-1	X	X
A-3	4	MM-2	X	X
K-12	9	MM-3	X	X
I-11	4	MM-4	X	X
J-5	9	MM-5	X	X
E-11	17	MM-6	X	X
F-2	17	MM-6 7 112	X	X
K-8	8	MM-8	X	X
E-6	7	MM-9	X	X
A-5	8	MM-10	X	X
H-11	18	MM-11	X	X
I-12	7	MM-12	X	X
G-11	6	MM-13	X	X
F-11	31	MM-14	X	X
C-13	~~31~~ 30 112	MM-15	X	X
G-4	30	MM-16	X	X
H-3	15	MM-17	X	X
G-10	15	MM-18	X	X
C-15	21	MM-19	X	X
E-11	19	MM-20	X	X
J-8	16	MM-21	X	X
A-9	18	MM-22	X	X
K-2	31	MM-23	X	X

Hole #	Section	Zellars-Williams Lab No.	Matrix	-150 Mesh Clays
A-5	21	MM-24	X	X
P-16	20	MM-25	X	X
P-6	19	MM-26	X	X
O-15	16	MM-27	X	X

COUNTY OF SARASOTA

FLORIDA

BOARD OF COMMISSIONERS

ANDREW SANDEGREN • DISTRICT 1
BEVERLY CLAY • DISTRICT 2
JAMES D. NEVILLE • DISTRICT 3
JOHN M. SABA, JR. • DISTRICT 4
LARRY RHODES • DISTRICT 5
ED MAHONEY • COUNTY ADMINISTRATOR

P.O. BOX 8
SARASOTA, FLA. 33578
PHONE 813/365-1000

RECEIVED
APR 25 1980

April 23, 1980

Mr. J.M. Williams
Executive Vice President
Zellars-Williams, Inc.
4222 South Florida Avenue
Lakeland, Florida 33803

Dear Mr. Williams:

Thank you very much for your letter of April 16, 1980, concerning the transmittal of matrix and slime samples from your Estech core washing program.

As per your request, I have verified the attached inventory and acknowledged receipt of these samples by signing a copy of your cover letter to me. Please note that the following changes were made on your sample inventory sheet:

1. Line 8, Hole #F-2, your lab number has been changed from MM-6 to MM-7. I believe this was simply a typo.

2. Line 16, Hole #C-13, I believe that hole was in Section 30 rather than in Section 31.

I hope the above and the attached will help complete your records and encourage you to advise me of any problems created by the above two changes. Thank you very much for your prompt action on this.

Sincerely yours,

Jeffrey L. Lincer, Ph.D.
County Environmental Specialist

JLL/bml
Attachment

cc: Mr. Dick Nelson, County Attorney

ANALYSIS OF ESTECH CORE SAMPLES FOR NATURAL RADIOACTIVE CONTENT

James E. Cline and Joanne Hollcroft

Science Applications, Inc.
Rockville, MD

SUMMARY:

Sixty six Estech core samples were analyzed for concentrations of uranium, radium, thorium and potassium. Techniques used in the analyses were those of non-destructive gamma ray spectrometry. Concentrations of radium varied from 0.44 pico curies per gram in the final tailings to 30 pico curies per gram in the pebble. The low concentration of uranium in the samples gave rise to large statistical errors, but over all it was seen that the Ra 226 was in equilibrium with its parent uranium.

1.0 BACKGROUND

Radioactivity exists normally in common soils, minerals, and sedimentary deposits. The activity consists principally of the natural radioactive decay chains that begin with the two isotopes of uranium, ^{235}U and ^{238}U, the thorium isotope, ^{232}Th, and an isotope of potassium, ^{40}K. The decay of the uranium and thorium nuclides initiate chains of radioactive decays; each nuclide in the chain decays either through the emission of beta or alpha particles. Gamma rays are often emitted following a beta decay. The end product of each chain is a stable isotope of lead. Every nuclide in a chain has a different half-life; most are very short (i.e., less than a few hours) but all are shorter than the half-life of the initial chain parent. Hence, if the material containing these nuclides is undisturbed for a long period of time, each member of the decay chain is present and the material is said to be in radioactive equilibrium.

The characteristics for the decay of every radioactive nuclide species are unique to that nuclide. Measurements of the type and energies of the radiation emitted in a decay generally permit a unique identification of the presence of the specific nuclide in the sample. This quality has been likened to that of a "fingerprint". In addition, a measurement of the quantity of the radiation will give a quantitative assay for that radioactive nuclide in the sample. Of the three principal types of radiation emitted in radioactive decays, alpha, beta or gamma radiation, gamma radiation is generally the most useful for assay purposes. Gamma rays, unlike beta or alpha particles, can penetrate substantial thicknesses of material without severe loss in either energy or intensity. Hence, measurements of the gamma radiation (gamma-ray spectroscopy) can be used to assay bulk samples quantitatively for naturally occurring activities as well as for artificially produced radioactivity. This technique is called non-destructive assay (NDA) by gamma-ray spectroscopy.

The method for the quantitative assay of materials for uranium, thorium, radium, and potassium was developed for the assay of ore samples; it was developed for the U.S. Department of Energy (DOE), under contract with the Bendix Field Engineering Corp. The techniques, detailed in Reference 1, use the gamma-rays emitted by the shorter-lived members of the ^{238}U decay chain

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1. Development of New and Improved Data Reduction Techniques for Radiometric Assay of Bulk Uranium Ore Samples, J. E. Cline, Science Applications, Inc., Unpublished report to Bendix Field Engineering Corp., Grand Junction, CO, September 1977.

(^{214}Bi, ^{214}Pb, and ^{234m}Pa); of the ^{235}U decay chain (^{231}Th and ^{231}Pa); and of the ^{232}Th decay chain (^{228}Ra, ^{227}AC, ^{212}Bi, ^{212}Pb, and ^{208}Tl). Because of the longer half-lives of some of the nuclides in the ^{238}U chain (principally ^{234}U and ^{226}Ra), radioactive equilibrium may not be realized in this chain for samples that have been subjected to chemical separations. These separations may be deliberate or may occur through leaching by liquids. The degree of equilibrium between uranium and radium, historically called "dis-equilibrium" in the field of uranium mining, is given by the ratio of the radioactive emission rate of uranium to that of radium. A value for dis-equilibrium of unity signifies equilibrium, whereas a value greater than one denotes the degree of the lack of an equilibrium. A lack of equilibrium is important in the present context only in that it worsens the sensitivity and accuracy of uranium assay; this is because most of the gamma rays emitted in the ^{238}U decay chain came from nuclides that follow radium in the chain.

Difficulties can also result from a lack of equilibrium between ^{226}Ra and its daughter, ^{222}Rn. The nuclide ^{222}Rn is an isotope of a noble gas and can escape from a sample. This problem can be easily solved through proper packaging of the sample and a delay of at least seven days between packaging and analysis to allow re-establishment of the radioactive equilibrium.

Other facets of the technique involve corrections for attenuation of the gamma rays in the bulk material of the source, the partitioning of the principal gamma ray from the decay of ^{235}U (unresolved in the measurements from a gamma ray of ^{226}Ra at a similar energy) into its components, and the use of all observed gamma rays to obtain the best values for the assay. These aspects are described in Reference 1.

2.0 MEASUREMENTS AND ANALYSES

2.1 Sample Preparation

Table 1 gives a list of samples analyzed in the present study. Zellar-Williams, Inc. prepared the samples by drying, packaging in 4-inch diameter by 2-inch thick plastic containers. When the amount of sample material was not sufficient to fill the container, the sample was homogeneously mixed with the necessary volume of sugar. The samples were then stored for at least 10 days before analysis.

Standards

During 1976-77 SAI participated in a program with the Department of Energy (DOE) to develop techniques for the analysis of uranium ore samples. Nineteen samples of standard material were prepared by DOE and distributed to different laboratories for interlaboratory and intertechnique comparisons. The results of these intercomparisons are given in Table 7 of the project report. Sample 22683, containing uranium and thorium concentrations most comparable to those of the present samples was used as a standard for the present measurements.

An analysis of this standard during the series of core sample analyses appears in the following table. It compares favorably with previous measurements of the sample, thereby validating the accuracy of the core sample analyses.

SUMMARY OF RESULTS FROM SAMPLE BENDIX ORE #22683

ACTIVITY	(PICOCURIES/GRAM) CONCENTRATION	UNCERTAINTY
RADIUM	13.67910	0.68395
URANIUM(235-U)	0.82504	0.41029
URANIUM(238-U)	39.38416	10.94291
THORIUM	12.19268	1.25162
POTASSIUM	14.68395	1.47834

* DISEQUILIBRIUM RATIO : 1.32570+,- 0.66259

* THIS IS THE RATIO OF 'TRUE' URANIUM TO 'EQUIVALENT URANIUM (AS DETERMINED FROM RADIUM). A VALUE OF 1.0 INDICATES URANIUM-RADIUM EQUILIBRIUM.

TABLE 1

ESTECH CORE SAMPLES RECEIVED FOR ANALYSIS FROM ZELLAR-WILLIAMS, INC.

ZW#	DESCRIPTION	HOLE	SECTION	PACKAGING DATE	ANALYSIS DATE	NET WEIGHT (gm)
MM1	Matrix	J-6	4	4-3-80	4-30	402.3
MM1	Clays	J-6	4	4-3-80	5-5	268.4
MM2	Matrix	A-3	4	4-3-80	4-30	420.9
MM2	Clays	A-3	4	4-8-80*	5-2	195.7*
MM3	Matrix	K-12	9	4-3-80	4-30	411.4
MM3	Clays	K-12	9	4-3-80	4-30	238.2
MM4	Matrix	I-11	4	4-3-80	5-5	490.4
MM4	Clays	I-11	4	4-3-80	5-5	275.8
MM5	Matrix	J-5	9	4-2-80	4-17	416.1
MM5	Clays	J-5	9	4-3-80	4-17	291.2
MM6	Matrix	E-11	17	4-3-80	5-1	334.0
MM6	+6M Pebble	E-11	17	4-8-80	4-18	141.4*
MM6	+14M Pebble	E-11	17	4-8-80	4-21	454.9
MM6	Final Conc.	E-11	17	9-8-80	4-21	532.5
MM6	Comb. Tail	E-11	17	4-8-80	4-22	464.3
MM6	Clays	E-11	17	4-8-80	4-21	226.3
MM7	Matrix	F-2	17	4-2-80	4-21	371.3
MM7	Clays	F-2	17	4-8-80	4-22	270.0
MM8	Matrix	K-8	8	4-2-80*	4-28	389.8
MM8	Clays	K-8	8	4-3-80	4-14	265.3
MM9	Matrix	E-6	7	4-2-80	4-17	344.5
MM9	Clays	E-6	7	4-3-80	4-18	229.0
MM10	Matrix	A-5	8	4-2-80	4-17	360.2
MM10	Clays	A-5	8	4-8-80	4-23	276.4
MM11	Matrix	H-11	18	4-2-80	4-23	341
MM11	Clays	H-11	18	4-8-80	4-23	244.6
MM12	Matrix	M-12	7	4-2-80	4-18	378.9
MM12	Clays	M-12	7	4-11-80	4-23	261.1

* repacked resealed 4-14-80

* sugar added

TABLE 1 (continued)

ZW#	DESCRIPTION	HOLE	SECTION	PACKAGING DATE	ANALYSIS DATE	NET WEIGHT (gm)
MM13	Matrix	G-11	6	4-2-80	4-21	351.6
MM13	+6M Pebble	G-11	6	4-8-80	4-26	286.5*
MM13	+14M Pebble	G-11	6	4-8-80	4-22	460.3
MM13	Final Conc.	G-11	6	4-8-80	4-30	527.0
MM13	Comb. Tail	G-11	6	4-8-80	4-28	477.2
MM13	Clays	G-11	6	4-8-80	4-28	261.8
MM14	Matrix	F-11	31	4-8-80	4-22	403.3
MM14	Clays	F-11	31	4-9-80	4-24	260.8
MM15	Matrix	C-13	30	4-8-80	4-23	358.9
MM15	Clays	C-13	30	4-9-80	4-30	257.1
MM16	Matrix	G-4	30	4-8-80	4-24	398.2
MM16	Clays	G-4	30	4-9-80	4-24	256.2
MM17	Matrix	H-3	15	4-8-80	5-2	378.3
MM17	Clays	H-3	15	4-9-80	4-24	243.7
MM18	Matrix	G-10	15	4-8-80	4-29	340.2
MM18	Clays	G-10	15	4-9-80	4-29	290.0
MM19	Matrix	C-15	21	4-9-80	5-2	422.6
MM19	+6M Pebble	C-15	21	4-9-80	4-29	399.8
MM19	+14M Pebble	C-15	21	4-9-80	4-29	438.3
MM19	Final Conc.	C-15	21	4-9-80*	4-29	495.4
MM19	Comb. Tails	C-15	21	4-9-80	4-29	460.2
MM19	Clays	C-15	21	4-9-80	4-29	262.6
MM20	Matrix	E-11	19	4-9-80	4-28	375.2
MM20	Clays	E-11	19	4-9-80	4-24	266.4
MM21	Matrix	J-8	16	4-9-80	5-5	447.0
MM21	Clays	J-8	16	4-9-80	5-2	257.2
MM22	Matrix	A-9	18	4-9-80	4-26	406.6
MM22	Clays	A-9	18	4-9-80	4-24	272.4
MM23	Matrix	K-2	31	4-10-80	4-28	372.8
MM23	Clays	K-2	31	4-10-80	4-28	258.7
MM24	Matrix	A-5	21	4-10-80	4-28	325.6
MM24	Clays	A-5	21	4-10-80	4-30	238.1

TABLE 1 (continued)

ZW#	DESCRIPTION	HOLE	SECTION	PACKAGING DATE	ANALYSIS DATE	NET WEIGHT (gm)
MM25	Matrix	P-16	20	4-10-80	4-25	360.6
MM25	Clays	P-16	20	4-10-80	4-24	258.7
MM26	Matrix	P-6	19	4-9-80	4-29	389.4
MM26	Clays	P-6	19	4-11-80*	4-29	286.6
MM27	Matrix	O-15	16	4-9-80	4-29	410.6
MM27	Clays	O-15	16	4-10-80	4-26	277.4
Blank	Sugar	--	--	4-11-80	4-21	257.9

2.2 Measurement of Gamma Radiation

Measurement of the gamma radiation emitted by the samples used a 4096-channel Ge(Li) gamma-ray pulse-height spectrometer. This device is a high-resolution gamma-ray spectrometer that is capable of quantitatively measuring the energy spectrum of gamma rays emitted by a source. The basic spectrometer hardware, although complicated, is commercially available and readily obtainable from several vendors.

A gamma-ray spectrum is an energy vs. intensity distribution of gamma-ray energies absorbed in the detector. It consists of a continuous distribution of energy (resulting from single interactions of gamma rays with the detector by the Compton effect) upon which are superimposed sharp peaks that are the result of the complete absorption of gamma rays by the detector, the so-called full-energy peaks. It is through analyses of the full-energy peaks that most gamma-ray spectroscopy is done.

Primary calibration of the spectrometer for detection efficiency is done through the use of NBS sources or sources traceable to the NBS. Calibration for the sources used in the present measurements uses a verified and documented technique described in References 1-3. The calibration procedures have shown demonstrated accuracies of better than 10 percent.

Samples were analyzed for times of 8000 and 40000 seconds. These long counting periods were required because of the very low-level of activities found in the samples. Similarly, because of these low activities, the samples were placed as close to the detector as was possible for the analyses. This increased the detection sensitivity.

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2. Technique of Gamma-ray Detector Calibration for Extended Sources, J. E. Cline, Trans. A.N.S., Supplement V.28, p.15 (1978).

3. Quantitative Plutonium and Uranium Analyses, J. E. Cline and P. G. Voilleque, ISPO-60, August 1979.

2.3 Data Analysis

Analysis of the acquired pulse-height spectra to extract the assay results consists of the following steps:

1. Location and identification of the full-energy peaks in the spectrum;
2. Calculation of the energy equivalent of the full-energy peak;
3. Identification, on the basis of gamma-ray energy, of the most probably nuclide assignment for each gamma ray;
4. Determination of the net area of each full-energy peak (i.e., gross area minus base-line area;
5. Calculation of radionuclide concentration from net area using detection efficiency-energy calibration and absolute decay intensities (from basic nuclear decay data); and
6. Calculation of best value for the concentration of each nuclide through a weighted average of the determinations from all gamma rays emitted in the decay of that nuclide.

These computations can be done by hand, but are most easily done using the mini-computer associated with most gamma-ray spectrometers. Details of the computations and the computer program used in the present measurements are given in Reference 1. The calculations also partition the 186-keV transition into the two components--that from the decay of ^{235}U, and that from the decay of ^{226}Ra. Statistical uncertainties are propagated throughout all the calculations.

A typical analysis result, in the form of the output from the analysis computer, are given in Appendix A. The uncertainties given with the final summary result only from the propagation of the statistical uncertainties throughout all of the computations. They do not reflect uncertainties in the accuracy of the detection efficiency determination (estimated at ±5%) or in the basic nuclear data.

3.0 Results and Discussion

Table 2 summarizes the results of the analyses of the samples for radium, uranium, thorium, and potassium, in terms of pico curies per gram. The results obtained for all peaks of ^{235}U as well as the results from ^{231}Pa and ^{226}Ra were checked and found to be consistent within statistical errors for spectra of all samples.

The sugar had no discernable activity.

Comparison of radium content of samples counted 7 days after packaging and again 20 days later shows that the Ra 226 was in equilibrium with Rn 222 as seen in the table below:

RADIUM CONCENTRATION (picocuries per gm)

Sample	7 days	27 days
MM1 Matrix	9.73±0.49	9.79±0.49
MM1 Clay	4.78±0.28	4.99±0.25
MM4 Matrix	5.42±0.27	5.58±0.28
MM4 Clay	3.00±0.24	3.01±0.26

The 1001 KeV energy gamma ray used to identify ^{238}U is a low intensity radiation seen in only 0.6% of the disintegration of ^{234}Pa, the ^{238}U daughter. Thus with the very low concentrations of ^{238}U as encountered in the core sample, the uncertainty in the ^{238}U analysis is large and its measurement is less reliable than that of ^{226}Ra.

The ratio of uranium obtained from the ^{235}U measurement to the uranium equivalent obtained from the ^{226}Ra - ^{222}Rn spectra is tabulated as the disequilibrium ratio in Table 2. Figure 1 displays distributions of disequilibrium ratios calculated for the core sample analyses. When all of the data are reviewed, it is clear that uranium-radium equilibrium exists in the core samples.

TABLE 2

SUMMARY OF ANALYSIS RESULTS OF ESTECH CORE SAMPLES

Concentrations in Pico curies/gm ± 2σ

Sample MM-	Radium (Ra226)	Uranium (U235)	Uranium (U238)	Thorium (Th232)	Potassium (K40)	Disequilibrium Ratio
1 Matrix	9.73±0.49	0.51±0.22	11.8±7.7	0.33±0.07	3.5±0.8	1.1±0.5
1 Clays	5.00±0.25	0.36±0.03	11.5±3.2	0.56±0.04	6.6±0.5	1.6±0.14
2 Matrix	11.1±0.5	0.51±0.06	15.1±3.5	0.55± .07	2.5±0.3	1.0±0.1
2 Clays	12.9±0.6	0.61±0.07	25.3±9.1	1.34±0.40	5.2±1.3	1.0±0.1
3 Matrix	10.4±0.5	0.51±0.08	NS*	0.52±0.16	3.2±0.7	1.1±0.2
3 Clays	2.84±0.14	0.30±0.27	NS	0.43±0.12	5.7±0.4	2.3±2.1
4 Matrix	5.58±0.28	0.34±0.25	6.36±5.33	0.27±0.06	1.8±0.6	1.3±1.0
4 Clays	3.0 ±0.24	0.16±0.01	6.9 ±4.7	0.56±0.25	3.9±0.7	1.2±0.5
5 Matrix	13.0±0.7	1.07±1.69	15.9±6.9	0.4 ± .05	0.5±0.8	1.8±2.9
5 Clays	14.0±0.7	0.74±0.04	12.8±7.2	1.1 ±0.1	5.3±0.9	1.1±0.1
6 Matrix	4.99±0.25	0.24±0.03	NS	0.44±0.13	5.0±0.8	1.1±0.1
6+6M Pebble	21.4±1.1	1.02±0.12	20.9±17.4	2.1 ±2.7	2.7±1.6	1.0±0.1
6+14M Pebble	31.0±1.5	1.52±0.21	41.4±11.5	0.5 ±0.5	1.3±1.0	1.1±0.1
6 Final Conc.	18.0±0.9	1.20±0.85	29.6±8.4	1.0 ±0.3	1.5±0.8	1.5±1.0
6 Comb. Tail	0.55±0.23	.005±.040	2.6 ±2.5	0.18±0.09	4.3±0.5	0.2±1.6
6 Clays	3.47±0.47	0.18±0.31	NS	0.7 ±0.3	7.7±1.1	1.1±2.0
7 Matrix	4.69±0.23	0.51±0.71	NS	0.25±0.04	3.1±0.8	2.4±3.3
7 Clays	3.62±0.18	0.25±0.08	6.3 ±3.0	0.56±0.08	6.0±0.5	1.5±0.5
8 Matrix	9.05±0.45	0.42±0.31	NS	0.66±0.18	2.4±0.9	1.0±0.8
8 Clay	10.9±0.5	0.57±0.09	12.9±4.5	1.37±0.13	8.6±0.5	1.1±0.2
9 Matrix	4.9 ±0.3	0.33±0.05	NS	0.50±0.26	5.7±0.9	1.5±0.2
9 Clay	7.52±0.37	0.37±0.23	17.5±4.0	0.90±0.35	6.5±0.6	1.1±0.7
10 Matrix	8.6 ±0.4	0.49±0.37	NS	0.92±0.75	2.2±0.8	1.2±0.9
10 Clay	5.8 ±0.5	0.35±0.05	12.0±5.7	0.81±0.13	6.8±0.9	1.3±0.2
11 Matrix	5.79±0.29	0.31±.10	NS	0.39±0.09	2.8±0.7	1.2±0.4
11 Clay	6.3 ±0.35	0.28±0.05	19.6±9.1	0.71±0.20	2.8±1.2	1.0±0.1
12 Matrix	8.5 ±0.4	0.42±0.02	15.7±3.1	0.27±0.12	1.6±0.3	1.1±0.1
12 Clay	8.6 ±0.4	0.47±0.11	14.3±3.9	0.61±0.12	5.3±0.5	1.2±0.3

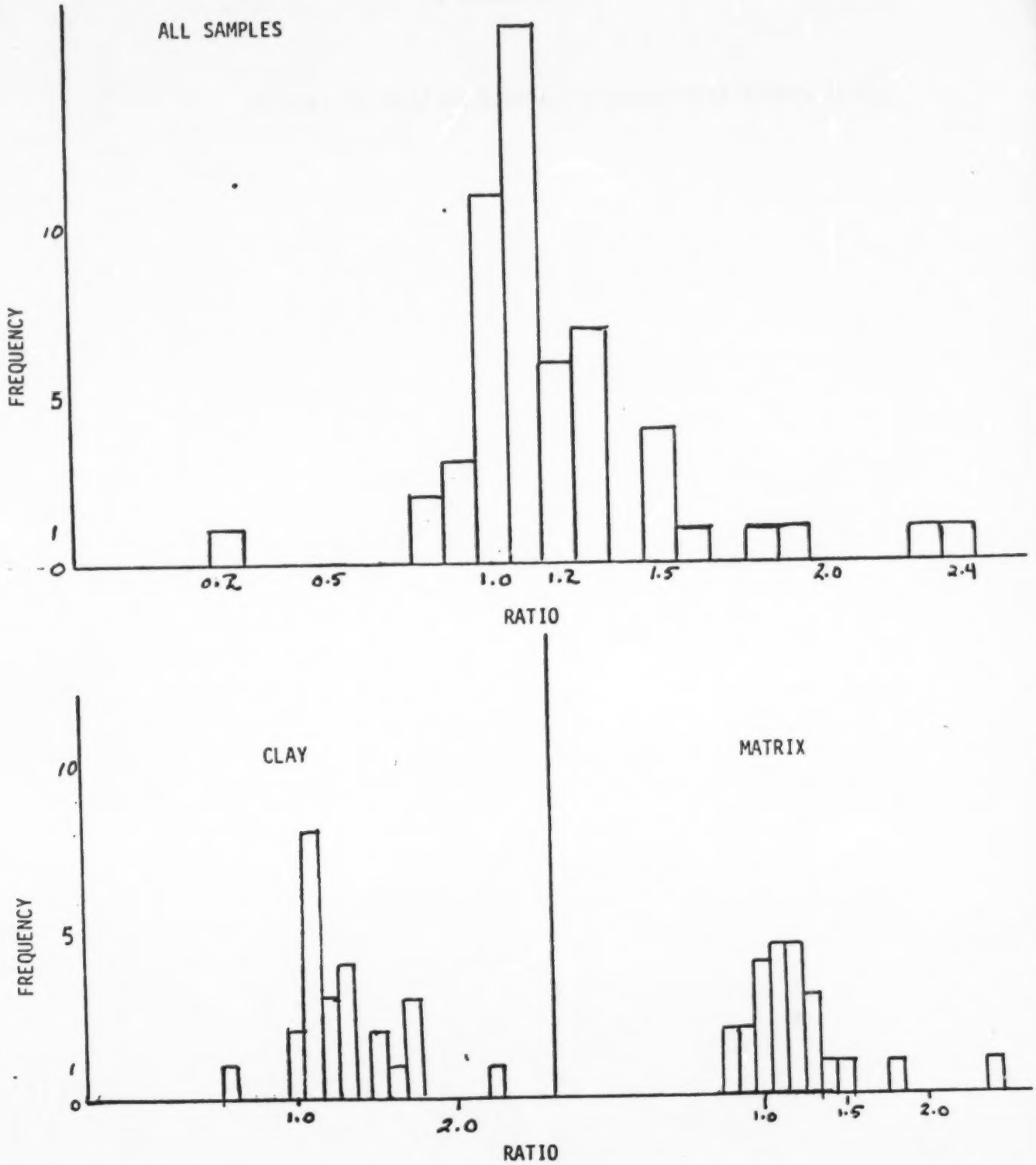
* Not seen

TABLE 2 (continued)

13 Matrix	10.7±0.5	0.53±0.19	9.6±3.8	0.39±0.11	2.7±0.4	1.1±0.4
13+6M Pebble	28.6±1.4	1.12±0.31	36.9±12.3	0.19±0.18	1.5±1.1	0.9±0.2
13+14MPebble	29.7±1.5	1.35±0.17	36.0±11.6	0.23±0.14	1.1±0.9	1.0±0.1
13 Final Conc.	23.4±1.2	1.19±0.33	16.3±9.9	0.98±0.56	1.6±0.8	1.1±0.3
13 Comb. Tail	0.48±0.08	NS	NS	0.12±0.03	2.4±0.3	Not determi
13 Clays	10.0±0.5	0.65±0.11	15.0±8.5	0.94±0.15	8.7±1.2	1.4±0.3
14 Matrix	4.48±0.22	0.26±0.08	NS	0.35±0.02	4.3±0.8	1.3±0.4
14 Clays	3.49±0.22	0.29±0.16	NS	0.47±0.17	5.1±0.9	1.8±1.0
15 Matrix	6.48±0.37	0.22±0.08	6.97±6.53	1.02±0.95	2.3±0.8	0.7±0.3
15 Clays	4.13±0.51	0.10± .08	NS	0.77± .04	5.9±1.2	0.6±0.4
16 Matrix	7.86±0.39	0.33±0.10	8.84±6.56	0.47±0.30	2.5±0.7	0.9±0.3
16 Clays	12.79±0.64	0.75±0.53	NS	0.76±0.29	6.5±1.1	1.3±0.9
17 Matrix	6.75±0.33	0.38±0.06	9.34±5.93	0.52±0.05	3.1±0.8	1.2±0.2
17 Clays	4.45±0.19	0.23±0.02	NS	0.65±0.27	5.3±1.2	1.1±0.1
18 Matrix	6.31±0.36	0.22±0.12	NS	0.46±0.25	3.7±1.1	0.8±0.4
18 Clays	3.95±0.37	0.27±0.01	14.5±6.6	0.75±0.19	7.0±1.1	1.5±0.2
19 Matrix	7.09±0.35	0.40±0.15	11.7±6.0	0.50±0.04	3.3±0.7	1.2±0.5
19+6M Pebble	23.1±1.2	1.15±0.26	40.7±10.0	0.20±0.12	0.7±0.9	1.1±0.3
19+14M Pebble	30.3±1.5	1.33±0.07	35.9±11.8	0.28±0.15	1.5±1.0	1.0±0.1
19 Final Conc.	21.9±1.1	0.95±0.45	29.7±9.9	0.75±0.06	0.7±0.9	1.0±0.5
19 Comb. Tail	0.47±0.04	0.04±0.02	NS	0.13±0.11	2.6±0.3	1.9±0.9
19 Clays	6.84±0.34	0.42±0.07	9.68±5.03	0.78±0.17	8.3±0.81	1.3±0.2
20 Matrix	6.29±0.31	0.29±0.01	NS	0.62±0.44	2.5±1.0	1.0±0.1
20 Clays	3.23±0.29	0.19±0.05	10.9±5.2	0.51±0.09	4.0±0.8	1.1±0.3
21 Matrix	12.7±0.6	0.69±0.11	18.7±8.2	0.56±0.18	2.1±0.7	1.2±0.8
21 Clays	11.4±0.6	0.62±0.03	15.9±4.4	0.94±0.17	4.0±0.5	1.2±0.1
22 Matrix	4.83±0.24	0.29±0.08	NS	0.44±0.39	2.8±0.7	1.3±0.4
22 Clays	5.13±0.25	0.23±0.27	7.69±5.39	0.61±0.03	4.3±0.8	1.0±1.2
23 Matrix	6.63±0.33	0.24±0.09	NS	0.68±0.23	4.3±1.0	0.8±0.3
23 Clays	3.03±0.14	0.18±0.23	NS	0.71±0.24	7.6±0.9	1.3±1.7
24 Matrix	4.70±0.37	0.30±0.09	NS	0.47±0.08	4.6±0.8	1.4±0.5
24 Clays	2.94±0.28	0.24±0.17	3.38±3.18	0.59±0.17	6.2±0.5	1.8±1.3
25 Matrix	10.2±0.5	0.55±0.24	19.6±8.0	0.61±0.58	3.2±0.9	1.2±0.5
25 Clays	5.88±0.29	0.49±0.31	NS	0.76±0.23	7.7±0.9	1.8±1.2
26 Matrix	7.05±0.35	0.29±0.07	1.26±5.7	0.34±0.10	3.2±0.7	0.9±0.1
26 Clays	5.37±0.27	0.25±0.11	7.74±3.14	0.57±0.07	6.1±0.5	1.0±0.5
27 Matrix	7.91±0.39	0.36±0.02	10.9±6.5	0.43±0.09	2.3±0.7	1.0±0.1
27 Clays	4.91±0.25	0.24±0.25	6.75±2.97	0.58±0.08	4.2±0.5	1.1±1.1
Sugar	0.31±0.55	0.0 ±0.0	NS	0.59±0.35	0.2±0.3	Not determi

FIGURE 1

DISTRIBUTION OF DISEQUILIBRIUM RATIOS



APPENDIX A

Typical output from computer-assisted analyses of samples.

RUN JEBRI
ANALYSIS DATE: APRIL 21 12:30 '80

UNIT? 8100:1 8180:2 1
DETECTOR: G
EFFICIENCY FILE NUMBER: 1
EFFICIENCY CURVE NAME: 6491
SAMPLE LOG NUMBER: 8406
MAGNETIC TAPE NAME: 116
TAPE RECORD NUMBER: 92
SAMPLE DESCRIPTION: ZN HA 6 +14 PEBBLE
SAMPLE VOLUME: 454.9
VOLUME UNITS: G
DECAY TIME(HRS): 0
SAMPLING DURATION(HRS): 0
NUMBER OF SIGMA UNITS ON PEAK FIND: 2
ENERGY SEPARATION FOR NUCLIDE IDENTIFICATION: 1

Reproduced from best available copy.

PLACE I/O DEVICE SWITCH ON REMOTE POSITION.....THEN TYPE CR
ANALYZER IS FREE TO ACQUIRE THE NEXT SPECTRUM

COUNTING RATES CORRECTED FOR BACKGROUND

* INDICATES MISSHAPED OR EXCESSIVELY WIDE PEAK.

COUNTING TIME: 8300 SECONDS

PEAK	CHANNEL	ENERGY	COUNTS/SEC.	GAMMA/SEC.	% UNCERT.	NUCLIDE ASSIGNMENTS
1	44.73	35.10	0.3327	607.67	4.06	
2*	49.44	38.53	0. 842	94.64	19.16	
3*	59.83	46.08	0. 343	16.68	47.26	
4	83.07	62.97	0.1833	27.50	10.04	
5*	101.45	76.33	1.0473	91.63	2.21	
6	123.39	92.28	0.4535	26.74	4.51	
7	193.97	143.59	0.1060	4.23	16.16	U-235,
8	201.28	148.90	0. 335	1.34	49.93	
9	207.78	153.63	0. 566	2.27	29.99	PA-231,
10	220.41	162.81	0. 422	1.72	38.61	U-235,
11	252.07	185.82	0.7777	34.81	2.29	U-235, RA-226,
12	278.42	204.98	0. 313	1.57	43.98	U-235,
13	329.15	241.86	0.6316	35.59	2.42	RA-226,
14	352.00	258.47	0. 425	2.52	27.21	RA-226,
15	367.62	269.83	0. 895	5.50	12.71	PA-231,
16	402.43	295.13	1.5805	104.43	1.07	RA-226,
17	429.38	314.73	0. 362	2.52	24.79	PA-231,
18	441.07	323.23	0. 286	2.03	31.68	
19	448.39	328.55	0. 262	1.89	33.96	
20	456.44	334.40	0. 322	2.36	27.44	
21	480.46	351.86	2.6027	198.49	0.76	RA-226,
22*	530.62	388.33	0. 387	3.21	20.96	RA-226,
23	621.72	454.57	0. 165	1.56	39.49	
24	632.30	462.26	0. 241	2.31	26.42	
25	666.99	487.48	0. 173	1.74	35.23	
26	699.18	510.89	0. 404	4.21	15.14	
27	772.38	564.11	0. 116	1.32	45.45	
28	795.80	581.14	0. 140	4731.64	39.39	

29	834.52	609.30	1.8104	220.04	0.87	RA-226,
30	911.57	665.33	0.528	6.94	9.95	RA-226,
31	956.83	698.24	0.102	1.40	40.46	
32	963.52	703.10	0.131	1.81	34.83	
33*	995.42	726.30	0.82	1.16	48.24	TH-228,
34	1017.42	742.30	0.138	2.00	31.63	
35	1053.02	768.19	0.1657	24.72	3.79	RA-226,
36	1077.32	785.86	0.371	5.65	12.41	RA-226,
37	1105.22	806.16	0.355	5.53	13.03	RA-226,
38	1141.04	832.21	0.116	1.85	40.98	PA-231,
39	1150.41	839.02	0.145	2.34	33.48	
40	1280.86	933.89	0.925	16.46	5.76	RA-226,
41	1321.85	963.70	0.122	2.23	34.94	
42	1352.38	985.91	0.99	1.85	38.68	
43	1372.70	1000.69	0.305	5.79	13.85	U-238,
44*	1396.78	1018.21	0.84	1.62	46.03	
45*	1483.57	1081.34	0.113	2.31	30.46	
46	1513.47	1103.09	0.77	1.60	47.44	
47	1536.80	1120.05	0.3639	76.54	2.13	RA-226,
48*	1554.83	1133.17	0.78	1.67	45.17	
49	1584.89	1155.04	0.411	8.89	9.97	RA-226,
50	1609.60	1173.01	0.39	0.85	91.91	
51	1621.79	1181.88	0.90	2.00	38.76	
52	1647.54	1200.61	0.87	1.96	34.72	
53	1656.31	1206.99	0.89	2.01	37.69	
54	1667.17	1214.89	0.78	1.78	40.79	
55	1698.61	1237.76	0.1275	29.44	4.12	RA-226,
56	1718.09	1251.94	0.77	1.80	41.40	
57	1757.60	1280.67	0.339	8.08	10.84	RA-226,
58	1790.24	1304.42	0.122	2.95	24.83	
59	1825.60	1330.15	0.94	2.32	31.56	
60	1890.44	1377.31	0.942	24.04	4.76	RA-226,
61	1901.21	1385.15	0.133	3.42	24.58	
62	1923.06	1401.05	0.255	6.61	14.22	
63	1932.23	1407.72	0.487	12.69	8.23	RA-226,
64	2005.01	1460.67	0.88	2.37	37.00	K-40,
65	2024.26	1474.68	0.71	1.94	40.29	
66*	2056.88	1498.41	0.72	1.98	41.12	
67	2071.36	1508.94	0.406	11.31	9.77	RA-226,
68	2094.22	1525.58	0.97	2.73	29.23	
69	2173.19	1583.04	0.137	4.00	19.81	
70	2188.73	1594.34	0.120	3.54	21.26	
71*	2195.89	1599.56	0.70	2.06	37.62	
72*	2246.87	1636.65	0.43	1.29	47.85	
73	2280.01	1660.77	0.257	7.85	9.63	
74	2291.76	1669.31	0.42	1.28	40.94	
75	2323.26	1692.24	0.52	1.63	39.58	
76	2346.50	1709.15	0.47	1.47	31.30	
77	2361.79	1720.27	0.35	1.10	46.65	
78	2374.06	1729.20	0.573	18.20	5.60	RA-226,
79	2421.98	1764.08	0.2842	91.96	2.15	RA-226,
80*	2473.58	1801.63	0.40	1.31	31.93	
81	2523.01	1837.59	0.86	2.90	20.48	
82	2536.02	1847.06	0.317	10.72	8.70	RA-226,
83*	2548.60	1856.22	0.34	1.15	44.89	
84	2617.82	1906.60	0.37	1.28	39.82	
85	2658.07	1935.89	0.39	1.39	37.62	
86	2819.27	2053.21	0.31	1.15	37.31	
87	2854.61	2078.94	0.34	1.28	26.24	
88	2869.69	2089.91	0.33	1.24	32.92	

89	2886.53	2102.17	0.	30	1.13	32.53	
90	2908.39	2118.08	0.	188	7.27	9.25	RA-226,
91*	2964.98	2159.27	0.	17	0.67	45.18	
92	2973.91	2165.78	0.	26	1.02	27.32	
93	3026.22	2203.85	0.	658	26.47	4.76	RA-226,
94	3148.82	2293.09	0.	45	1.89	23.32	RA-226,
95*	3184.16	2318.82	0.	10	0.41	35.36	
96	3246.25	2364.02	0.	12	0.52	31.62	
97	3297.90	2401.63	0.	7	0.32	40.82	
98*	3317.82	2416.13	0.	11	0.48	33.33	
99	3360.96	2447.53	0.	228	10.19	7.51	RA-226,
100	3382.69	2463.35	0.	6	0.27	44.72	
101*	3409.63	2482.97	0.	7	0.33	40.82	
102*	3444.80	2508.57	0.	6	0.28	44.72	
103*	3491.27	2542.41	0.	7	0.34	40.82	
104*	3509.54	2555.71	0.	5	0.22	50.00	
105	3590.53	2614.68	0.	46	2.20	21.56	TH-228,
106*	3691.09	2687.90	0.	11	0.53	33.33	
107*	3696.68	2692.12	0.	12	0.59	31.62	
108	3702.00	2695.84	0.	8	0.41	37.80	
109	3708.00	2700.21	0.	6	0.30	44.72	
110*	3743.00	2725.70	0.	5	0.24	50.00	
111*	3775.88	2749.64	0.	7	0.36	40.82	
112	3803.78	2769.96	0.	7	0.37	40.82	
113*	3817.00	2779.59	0.	6	0.31	44.72	
114*	3846.59	2801.13	0.	5	0.25	50.00	
115*	3862.50	2812.72	0.	5	0.25	50.00	
116*	3879.58	2825.16	0.	13	0.68	30.15	
117*	3914.50	2850.59	0.	5	0.25	50.00	
118	3939.11	2868.50	0.	5	0.25	50.00	
119	3961.24	2884.62	0.	7	0.38	40.82	
120*	3995.00	2909.21	0.	7	0.38	40.82	
121*	4014.67	2923.53	0.	5	0.26	50.00	
122*	4034.89	2938.26	0.	5	0.26	50.00	
123*	4045.18	2945.76	0.	7	0.39	40.82	

NUCLIDE	ENERGY	GAMMA/SEC. (DECAY CORR.)	UNCERTAINTY (%)	MICROCURIES/G
U-235	143.79	4.23	16.17	.15716792E -5
	162.90	1.72	38.60	.25620396E -5
	185.90	13.36	7.19	.14708357E -5
	205.00	1.56	43.98	.16906617E -5
PA-231	153.90	2.27	29.99	.19024009E -5
	235.89			
	270.09	5.50	12.70	.16347589E -5
	314.30	2.52	24.78	.41590768E -5
	427.19			
	832.00	1.85	40.98	.28240840E -5
RA-226	186.00	21.44	2.50	.31076575E -4
	241.89	35.59	2.42	.28345936E -4
	258.30	2.52	27.20	.18735019E -4
	295.20	104.42	1.06	.31334680E -4
	351.90	198.49	0.75	.31034595E -4
	388.30	3.20	20.96	.27208187E -4
	609.29	220.03	0.86	.30052920E -4
	665.20	6.93	9.95	.29436149E -4
	768.40	24.71	3.78	.30033961E -4
	785.90	5.64	12.40	.30791354E -4
	806.20	5.52	13.03	.26694425E -4
	934.09	16.46	5.75	.30857414E -4
	1120.30	76.53	2.13	.32250316E -4
	1155.30	8.89	9.96	.31257561E -4
	1238.09	29.44	4.12	.29546854E -4
	1281.09	8.08	10.83	.32673521E -4
	1377.80	24.03	4.76	.35525589E -4
	1408.10	12.69	8.23	.30412414E -4
	1509.40	11.30	9.77	.30669712E -4
	1729.79	18.20	5.59	.35455988E -4
	1764.50	91.95	2.15	.35021739E -4
	1847.60	10.72	8.69	.30045463E -4
	2118.69	7.27	9.24	.35703768E -4
	2204.10	26.46	4.76	.32759870E -4
	2293.40	1.89	23.32	.35103350E -4
	2447.69	10.19	7.50	.39076670E -4
TH-228	238.59			
	583.19			
	727.20	1.16	48.23	.98664199E -6
	860.50			
	2614.60	2.20	21.56	.36426737E -6
U-238	1001.00	5.78	13.84	.41438693E -4
K-40	1460.70	2.36	36.99	.13148763E -5

SUMMARY OF RESULTS FROM SAMPLE ..... MM 6 714 PEBBLE

(PICOCURIES/GRAM)

ACTIVITY	CONCENTRATION	UNCERTAINTY
RADIUM	31.03678	1.55184
URANIUM(235-U)	1.52144	0.20945
URANIUM(238-U)	41.43869	11.47761
THORIUM	0.46791	0.46373
POTASSIUM	1.31488	0.97290

* DISEQUILIBRIUM RATIO : 1.07747+,- 0.15781

* THIS IS THE RATIO OF 'TRUE' URANIUM TO 'EQUIVALENT URANIUM (AS DETERMINED FROM RADIUM). A VALUE OF 1.0 INDICATES URANIUM-RADIUM EQUILIBRIUM.

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